THE IRON TRADE REVIEW

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ALL TAKEN.

BESSEMER ORE RESERVED FAR IN ADVANCE.

Pig Iron Active, but Buyers More Careful.—Southern Sells Below $15 for Next Year.—Car Shortage.

Makers of pig iron, impressed by the firmness of iron ore sellers in declining to quote prices for next year and by the soundness of the reasons given for refusing, are less insistent, but content themselves by making reservations to meet their requirements for the year ending May, 1908. Hence, although no actual sales have been made, practically all of the Bessemer ore to be mined next year has been spoken for, as well as large tonnages of non-Bessemer grades. In some cases it has been impossible to comply with urgent requests for reservations. The anxiety of the furnace men concerning their supply up to the opening of navigation next year will not be decreased by the statement of shipments of ore for August, which, although heavier than those of the same month last year, fell below those of July of this year. Mining operations are still somewhat interfered with on account of inadequate supply of labor.

Buyers More Cautious.

The pig iron market is still active and in some districts prices are higher, but the disposition noted last week to place orders with more deliberation is still clearly in evidence. Conditions may on the whole be best described by the somewhat over-worked expression "sane and safe." In most buying centers the shortage of pig iron for prompt shipment is not much relieved and the shortage of cars is making delivery from southern points very slow, but the willingness of some buyers to pay high prices for spot iron has acted like magic in bringing tonnages from unexpected quarters. We note, for example, the sale of 1,700 tons of foundry iron at $20 for No. 2 for the last quarter of 1906. In the Chicago district buyers have been especially active and prices are about 50 cents higher. In other cities, like St. Louis, where conditions were feverish, there is much less excitement. The willingness of the principal producer of southern iron to sell at $15 for the first quarter of next year has resulted in a large tonnage being taken, especially in New York and New England where from 15,000 to 20,000 tons were disposed of. In some cases sales of southern iron have been made at $14.75 for next year's delivery. This fact indicates that the very high prices recently talked of for southern iron are not likely to prevail for 1907 delivery. The production of pig iron is slowly increasing. The new furnace of the Illinois Steel Co., at Joliet, Ill., which was blown in Sept. 1, will produce 500 tons of steel-making pig iron per day. Several southern stacks will soon be blown in.

Finished Materials.

The car shortage threatens to interfere seriously with the delivery of finished products. Although some shortage is usually expected when the crop movement begins, the prospect is that the difficulty in obtaining cars this fall will be greater than usual. The American Steel & Wire Co., whose August business was the heaviest of any month this year, has not had an adequate supply of cars. It has also been hampered by the scarcity of wire rods. The American Bridge Co. added about 50,000 tons to its orders during August and other concerns did a proportionately large business for a mid-summer month. The volume of orders is now very good with prospects of a decided increase next month. At some plate mills deliveries are being further delayed, especially in the west, as recent specifications have been extremely heavy. The leading interest is now taking orders for the first quarter of next year for sheet and tin plate. The market for these products is unusually strong. Operations of mills are still curtailed by a shortage of steel.

THE GREAT NORTHERN ORE DEAL.

(Special Telegram).

New York, Sept. 5.—The Great Northern ore deal of James J. Hill with the United States Steel Corporation is in the hands of a special committee and an announcement is expected within a few days.

In addition to rail sales noted in the regular market report, the following are announced: Chicago & Northwestern, 10,000 tons; Chicago & Milwaukee Electric, 3,000 tons; Milwaukee & Northern, 2,100 tons; Chicago & Western Indiana, 3,000 tons; Lake Shore Electric, 2,300 tons; miscellaneous, 3,300 tons. Negotiations are under way for large tonnage for a frog and switch company, at Chicago.

New Coal Unloading Record.—Records for two hoists in unloading coal from a lake freighter were smashed when in ten hours' work on the steamer H. S. Sill two Brown hoists on the Northwestern electric dock took out 4,200 tons of hard coal. The best previous record at the head of the lakes was something around 3,200 tons, so that the new record set by the Northwestern dock is about 1,000 tons faster than any other.

James Gayley, first vice president of the Steel Corporation, who has been attending the meeting of the American Institute of Mining Engineers in England and Germany, has returned to this country together with other members of the society, including Dr. R. W. Raymond and Mr. James P. Roe. The remaining members will return in the course of a week or two.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Pig Iron Buying Not So Brisk.—Activity in Financial Lines.

Office of THE IRON TRADE REVIEW, 521 PARK BUILDING, Sept. 4

The heavy buying movement of two weeks ago in the pig iron market, amounting almost to a frenzy, has worn itself out and, as noted in these reports last week, has resolved itself into a steady and more deliberate plan on the part of consumers to cover for their requirements for a considerable period ahead. There has been some buying for immediate requirements at the present high prices, but the rush to cover for the first half of next year on pig iron is not as headlong as it was. With the amount of iron already sold for first half delivery, there is no gainsaying a scarcity in practically all grades, the filled up condition of the books of finishing mills giving the consumer of steel making pig iron an almost definite knowledge of his requirements for a long time ahead, and the foundries are in much the same situation. There is still some prompt iron to be had and during the past week or ten days 1,500 tons of Northern No. 2 foundry iron was sold for last quarter delivery at $20, valley furnaces. For first half of next year between 1,500 and 2,000 tons of northern foundry sold at $18.50. The sales of Bessemer and basic iron during the week have been very small either for prompt or forward delivery.

The market in finished lines is ideal from a selling standpoint, mills being in such shape that they are decidedly independent about what they accept and there has been a great deal of picking and choosing from among the business offered. Steel bars are the conspicuous feature, the specifications and new business both being heavy, the specifications of the agricultural machine makers especially so.

The scarcity of semi-finished material is becoming more pronounced each week and it may now be stated positively that all the leading producers of billets and sheet bars are practically out of the market for the remainder of the year as far as new business is concerned and deliveries on existing contracts are getting behind more each week.

With the continued steady business during the summer months, when it is usually quiet and a slump in both prices and demand is the rule, the fall business is starting in from four to eight weeks earlier than usual, with an inclination on the part of buyers to cover as far ahead as they will be permitted to do so by producers of finished material. The stress is not in securing business, but in punching up the mills to make deliveries. With this condition there is a noticeable absence of advancing prices and but comparatively few premiums are asked except for rush business from unusual sources, and this class of business has been refused more often than it has been accepted. Conservatism is more freely shown by makers of finished material than by other interests, this being shown by the firm adherence to old prices on the staple products, although independent concerns, notably those sheet and tin plate makers who do not have their own supply of semi-finished material, are beginning to be hard pressed and unable to secure new long time contracts for their steel.

Pig Iron.—The pig iron market has been quieter during the past week than it had been for nearly a month previously, the big interests for the most part having covered for their requirements through the first quarter of next year and in some instances through the first half of next year and the sales of steel making iron for the week under review by valley furnaces have been light, although there has been some business. There is still quite an inquiry for foundry iron and approximately 1,700 tons has been sold for last quarter at $20, valley furnace, and a smaller lot was sold at a slightly higher price. While it may not be true as a general proposition, there is evidence of a gentlemen's agreement to make the scarcity proposition stronger than it really is. There can be no question that there is a scarcity of big proportion, but two weeks ago there was not a single furnace interest that would admit there was 1,700 tons of northern foundry in the valleys for last quarter delivery. Nevertheless a $20 price brought out that amount in one week. There are two interests that still have iron for last quarter delivery.

Steel making iron is scarcer than foundry iron and one heavy buyer in the valley is out for more Bessemer although it has bought 80,000 tons for delivery during the first half. The average August price of Bessemer, based on sales of 1,000 tons or over was $17.96. For deliveries during the remainder of the year $18.75 is asked and for basic iron $18.50. For the first half of 1907 the interest holding most of the available iron, while it is endeavoring to refrain from quoting at this time, is holding for the same figure, while other furnaces, most of whose sales are to allied interests quote $17.75 to $18.

Some hope, although it is not great, is held out that there may be more available pig iron for last quarter than is now in sight, this hope being that with the approach of colder weather production will increase although none of the valley furnaces have enough faith in this hope to sell against the possibility. Another peculiar feature about northern foundry iron is the disinclination of valley furnaces to sell for first quarter only, their proposition to inquiries invariably being to sell for deliveries over the first six rather than the first three months.

Southern and Virginia foundry iron has found a good market in this district owing to the high price of northern foundry iron. Southern No. 2 has sold at $16, Birmingham, for delivery during the remainder of the year with quotations $15.50 to $15.75 for first quarter.

On forward deliveries we quote as follows:

Bessemer Valley	18.25 to 18.75
Bessemer, Pittsburg	19.10 to 19.85
No. 1 Foundry, Pittsburg	19.60 to 19.85
No. 2 Foundry, Pittsburg	19.10 to 19.35
Gray Forge, Pittsburg	18.60 to 18.35
Basic, Valley	18.00 to 18.25
Basic, Pittsburg	18.85 to 19.10

Steel.—Semi-finished material is extremely scarce, with a heavy demand both by independent consumers and the finishing mills of the leading producers. For the remainder of the year the leading producers are out of the market as far as new business is concerned and billet and sheet bar mills are taxed to capacity to supply the demands made against them on existing obligations and the pressure of finishing mills. Sheet bars are quoted nominally at $30, Pittsburg, and soft Bessemer steel billets, 4 x 4, at $28.50, with open hearth $1 higher.

Ferro-Manganese.—For spot delivery ferro-manganese, foreign 80 per cent, is quoted at $90 to $92, Pittsburg, and for forward delivery $85 to $87.50. Ferro-silicon, 50 per cent, for early delivery, is quoted $97 and for forward deliveries $96.

Skelp.—On narrow widths and light gauges we quote as follows.

Bessemer, grooved, 1.62½c to 1.67½c; sheared, 1.67½c to 1.72½c; basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron skelp, grooved, 1.80c to 1.85c; sheared, 1.90c to 2c.

Muck Bar.—We quote a nominal market at $31.50, Pittsburg for all pig metal muck bar.

Hoops and Bands.—There has been a better demand during the past week and specifications against what is left of old contracts have been good. We continue to quote as follows:

Hoops, 1.90c in carload lots, and 2c on less than carload lots; bands, 1.50c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Cotton Ties.—The September price is 87½c per bundle, Pittsburg, and considerable business is still coming in from the south.

Structural Material. — Conditions reported a week ago still hold good, specifications and mill shipments running along at about the same gait and deliveries are neither improving nor going backward. There is every indication of a very lively business about October or November. The demand for deliveries is very urgent on old contracts and great progress is being made on projects now under way, conditions being very favorable to outside work and building is being rushed to the covering point before cold weather sets in. Construction companies are steadily receiving a large grist of small business, which in the aggregate amounts to a considerable tonnage. We quote:

Beams and channels, 15-inch, and under, 1.70c; over 15-inch, 1.80c; zees, 1.70c; tees, 1.75c; angles from three to six inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Plates. — So heavy has been the new business and the specifications against existing contracts that producers are extending their promises on deliveries and except on a well assorted contract 60 days is about the average. The steel car companies are now figuring on an immense number of new cars, the Harriman lines alone having inquiries out for upward of 10,000 steel cars, while for many others from 500 to 1,500 cars are being figured on. Except from old customers mills are now in a position to pick and choose their business and as a consequence are booking some very choice contracts. We continue to quote as follows:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Light plate schedule, No. 10, 1.70c; Nos. 11-12, 1.75c; Nos. 13-14, 1.80c; Nos. 15-16, 1.90c. Extras on the regular plate schedule are as follows per 100 pounds: boiler and flange steel plates, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c: marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates, varying not more than four inches, in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Rails and Track Material. — The current buying of standard sections is running along rather slowly, due largely to the fact that local interests are entirely sold up for the present year. There are several inquiries out for next year, but the business placed during the week under review has been light. There is a very heavy demand for light rails at the recent advanced price. Railroad spikes are in very strong demand and prices have advanced. On both iron and steel spikes nearby deliveries are extremely hard to obtain, at least one mill having been sold up to Dec. 1. We quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $31; 20 pounds, $32; 25 to 45 pounds, $30 to $31; angle bars for standard sections, 1.50c; spikes, $2.25 to $2.30.

Sheets.—In special instances where trade conditions make it necessary, business is now being accepted by the leading interest for the first quarter of next year, but this is by no means general. In no case has business been accepted for deliveries running past the second quarter of 1907, although buyers have shown a strong inclination to contract as far ahead as the producers will accept the business. Prices are very firm. There has been but very little, if any improvement in mill conditions and if there has been an improvement in the supply of semi-finished steel to sheet mills, the increased specifications of the past week have more than balanced it up and deliveries are no better than previously reported. We quote:

Black steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2.10c; Nos. 13-14, 2.15c; Nos. 15-16, 2.20c; Nos. 17-21, 2.25c; Nos. 22-24, 2.30c; Nos. 25-26, 2.35c; No. 27, 2.40c; No. 28, 2.50c; No. 29, 2.65c; No. 30, 2.75c. Galvanized, Nos. 10-11, 2.45c; Nos. 12-14, 2.55c; Nos. 15-16, 2.65c; Nos. 17-21, 2.80c; Nos. 22-24, 2.95c; Nos. 25-26, 3.15c; No. 27, 3.35c; No. 28, 3.55c; No. 29, 3.80c; No. 30, 4.05c. Corrugated roofing, $1.75 per square for No. 28 painted, 2½-inch corrugation; $3.10 per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Tin Plate.—As in the case of sheets, considerable business has already been done into the first quarter of next year, and in some instances through the first half, but these transactions are not of a general nature. These deliveries are made before the end of March. Producers, under present mill and market conditions, are not desirous of contracting throughout next year, and have not done so except as noted, the major part of the 1907 business now being accepted running only through the first three months.

We quote: $3.75 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in ten days.

Merchant Bars.—The week under review has seen several fair transactions in bar iron at the 1.60 base, but this could probably be shaded $1 per ton on forward deliveries, although it is the minimum for nearby shipment and some business has been refused at this figure for small tonnage. Refined bar iron for high grade railroad purposes is quoted 1.85c to 1.90c. We quote:

Common iron bars, 1.60c, Pittsburg, in carload lots, 1.65c in less than carloads; Bessemer steel bars, 1.50c; plow and cultivator, 1.50c net; channels, angles, zees and tees, under three inches, 1.60c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds, of a size, 0.30c advance.

Merchant Pipe.—The pipe business is in excellent shape and with the large amount of new business being placed and heavy specifications against old contracts, mills are getting behind in deliveries from six to eight weeks. Not for a year has there been the tonnage on the books there is at the present time, and it is increasing every day, not in large individual contracts, but in a multiplicity of smaller orders which in the aggregate make a very desirable business. No line pipe business of special

note has been placed or is pending, but the smaller mileages are good. Prices remain unchanged, with the extreme discount 81 per cent and 5 off to the large trade. We quote the following official discounts, consumers' carloads, with jobbers' discounts one point higher.

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
⅝ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ⅛ to 8 inches	60	49	56½	45½

Wire and Wire Nails.—It is still too early to expect the regular fall business, but orders are coming in several weeks in advance of the ordinary fall buying period and in good volume, nails and fence wire being particularly strong. Jobbers are beginning to lay in their stocks and consumers are also getting in early, making the situation almost ideal as far as outlook for fall business is concerned. So heavy has been the demand upon the finishing end of their mills that local producers are not on the market to sell rods, needing their entire product for the finishing mills. As yet there has been no change in prices, and we continue to quote as follows:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire, $1.70 to jobbers and $1.75 by carload.

Steel Bars.—Specifications are far in excess of shipments and new business is still coming in at a lively rate, this being the conspicuous feature of the market. The specifications of the agricultural machine makers are enormous. The leading interest has held steadily to its old price, 1.50c base Pittsburg, as have one or two independent makers, but others have advanced to 1.60c and for quick shipment considerable tonnage has been sold from jobbers' stocks at 1.65c. We quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch, 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base; half extra steel card.

Old Material.—There is still a scarcity of scrap of practically all grades and what dealers have in stocks is being held for higher prices. In some instances difficulty is being experienced in securing old material to fill contracts and most of the business of the past week has been between dealers, although the monthly scrap list of the railroads contained a fair amount that brought better prices than were secured a month ago. We quote:

Heavy melting stock, $16.75 to $17; No. 1 cast scrap, $16 to $16.50; cast borings, $9.50 to $10; bundled sheet scrap, $14 to $14.50; malleable scrap, $16 to $16.50; railroad wrought scrap, $17; low phosphorus scrap, $19 to $19.50; wrought turnings, $12.25 to $12.50; busheling scrap, $14.50 to $16; iron axles, $26.50 to $27; old rails, rerollers, $17.25 to $17.50.

Coke.—The coke market is strong and coke, both furnace and foundry grades, is comparatively scarce, in spite of the improved output of the regions. Foundry coke for spot shipment is quoted $3.50 to $3.60 and for forward delivery $3.40 to $3.50. Furnace coke is quoted $2.80 to $2.90. Some business has already been done for forward delivery at practically the current ruling price. For the week ending August 25 the detailed report shows a total of 23,358 ovens of which 21,747 were active and 1,611 were idle. The total estimated production was 278,169 tons, a slight loss compared with the production of the previous week. The decrease, however, was so slight that no conditions of the market could be held responsible for it. There were no changes of note reported in the active and idle lists of ovens.

In the lower Connellsville region there are 8,888 ovens, of which 8,640 were active and 248 were idle. The total estimated production was 111,597 tons, a gain of 3,000 tons compared with the production of the week before. There was a gain in the number of ovens in the lower district of nearly 100 ovens, caused chiefly by the firing of new ovens by the Washington Coal & Coke Co. at its No. 1 plant.

CLEVELAND.

Record Ore Movement for August.—Foundries Using Scrap.

Office of THE IRON TRADE REVIEW, Brownin Building, Sept. 4

Iron Ore.—Shipments from upper lake ports during August were 5,665,815 tons, as against 5,009,382 tons in August, 1905, a gain of slightly more than 11 per cent. For the year to Sept. 1 the movement was 22,721,095 tons, against 21,048,056 tons to Sept. 1, 1905, an increase of almost eight per cent. This is the record movement for August. If shipments can continue the ten per cent increase over last year's figures, which has been the average gain through the summer months, the movement by water for the year will be slightly less than 36,400,000 tons. By ports the August shipments were as follows:

	August, 1905.	August, 1906.
Escanaba	706,252	871,106
Marquette	421,685	403,331
Ashland	501,184	571,698
Superior	700,997	906,960
Duluth	1,433,556	1,601,941
Two Harbors	1,245,708	1,310,779
	5,009,382	5,665,815
	To Sept. 1, 1905.	To Sept. 1, 1906.
Escanaba	3,227,865	3,436,611
Marquette	1,882,211	1,708,937
Ashland	2,148,351	2,251,057
Superior	3,168,026	3,578,496
Duluth	5,589,491	6,584,272
Two Harbors	5,032,112	5,161,722
	21,048,056	22,721,095

With less than two-thirds of this season's tonnage brought down, ore interests are firmly refusing to consider the question of prices for 1907, and the situation in this particular is unchanged. It is stated on good authority, however, that the Bessemer supply for the season is already under reserve.

Pig Iron.—Inquiries of the past week have aggregated a heavy tonnage, but actual sales in this district have been confined almost entirely to foundry iron for the first and second quarters of next year, on which the minimum price is now $18.50 valley for No. 2. For basic there has been considerable inquiry, with some sales in the neighborhood of $18.50 valley for early 1907 delivery. The Bessemer supply is about exhausted, and the association has held no meeting for some time for the simple reason that it has nothing to dispose of. One large consumer is in the market for a good tonnage for delivery during the remainder of the year and the trade is puzzled to see where it is to come from. Malleable is scarce at $18.25 valley. The scattered southern interests which have not withdrawn from the market are selling heavily and have made large bookings during the past fortnight, one producer reporting sales in excess of 25,000 tons, almost entirely in small lots. Spot iron has become so difficult to secure locally that many foundries are substituting scrap, thus creating such a demand for high silicon iron as a softener that it is becoming scarce. We quote, Cleveland delivery, as follows:

Bessemer	$18.75 to 19.25
No. 1 Foundry	19.00 to 19.50
No. 2 Foundry	18.75 to 19.25
No. 3 Foundry	18.25 to 18.75
No. 2 Southern	19.10 to 19.60
Gray Forge	17.00 to 17.50
Gray Forge, Southern	16.00 to 16.50
Lake Superior charcoal	19.50 to 20.00

Coke.—Producers are quoting only when requested, prices being about $3.00 for furnace and $3.50 for foundry at the ovens, for either 1906 or 1907 delivery. The former is hard to secure, production being curtailed by labor shortage and the car supply being inadequate.

Finished Materials.—Deliveries on structural materials, which have been steadily improving for some time past, are in the balance at present, mills just about being able to run even. There are occasional reports of price-cutting in plates, but upon investigation these invariably resolve themselves into slight concessions in freight or otherwise made by small concerns of a limited variety of output. Sheets are extremely strong and the recent advance in blue annealed is being well maintained. There is considerable inquiry for bar iron for 1907 delivery from car-building interests, with the probability that contracts will be made at higher prices than present official quotations. Steel bars are scarce, a number of the largest producers being out of the market.

Old Materials.—Improvement continues, with prices higher in a few instances and the general tone being upwards. Foundries have become large buyers through the scarcity of early delivery iron, and machine cast scrap is correspondingly strong. Mills are also buying largely. Several lists of big tonnages have come out recently, among them being the Erie, the B. & O. with about 5,000 tons, the Pennsylvania lines west with a similar amount, the Pennsylvania lines east with about 15,000 tons and a small list by the Big Four. We quote, f. o. b. Cleveland, as follows, gross tons being given in the first paragraph.

Old iron rails	$23.50 to 24.50
Old steel rails (over 6 feet)	17.50 to 18.50
Old steel rails (under 6 feet)	17.00 to 17.50
Old car wheels	17.50 to 18.00
Steel boiler plate	15.00 to 15.50
Steel axles	20.00 to 21.00
Malleable iron (railroad)	16.50 to 17.00
Malleable iron (agricultural)	14.00 to 14.50
Heavy steel	16.50 to 17.00
Country mixed steel	14.50 to 15.00

We quote net tons as follows:

No. 1 R. R. wrought	$18.00 to 18.50
No. 1 busheling	14.50 to 15.00
No. 1 machine cast	14.75 to 15.25
Iron axles	23.50 to 24.50
Axle turnings	11.00 to 11.50
Wrought turnings (free from cast)	10.00 to 10.50
Grate bars	11.50 to 12.00
Pipes and flues	14.00 to 14.50
Tank iron	12.00 to 12.50
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.00
Wrought drillings	10.00 to 10.50
Stove plate	11.00 to 11.50
Cast borings	7.50 to 8.00

PHILADELPHIA.

High Prices for Spot Iron.—Increased Production Expected.

Sept. 4.

Pig Iron. — The insistent demands of buyers have produced a greater degree of confusion in the market than has been seen for several years. Some consumers, badly rattled by the steady advance in prices, seem willing to offer almost any sum for September deliveries, and as a result prices have reached a point where the range is very great. No. 2X foundry, which is most in demand, can generally be had by regular customers for $20 to $20.25, but not a few instances are reported where unfortunate buyers have been willing to pay $21, and No. 1X has gone as high as $21.50 and $22 in such exceptional cases. The market has continued very active, with many orders and inquiries for 1907, but some uneasiness is felt over the situation, which cannot be said to be entirely to the liking of either producer or consumer. Production continues on a somewhat restricted basis because of the number of furnaces out of blast for repairs, but October, November, and December are expected to witness a considerable increase in the output and bring it fully up to the consumptive demand. It seems idle, however, to point out this fact to some consumers, who are much exercised over the temporary scarcity, and insist upon buying at the highest price in years. These purchases are mostly in comparatively small lots. Eliminating the fancy figures paid by badly frightened foundry men, the range of prices may be said to be as follows:

No. 1X Foundry	$20.50 to 21.00
No. 2X Foundry	19.75 to 20.50
No. 2 Plain	19.00 to 19.50
Standard Gray Forge	17.50 to 18.00
Basic	18.25 to 18.75
Low Phosphorus	24.75 to 25.00

New Materia'.—Not a weak spot can be found in the market for finished products, where the activity continues at the high pressure of recent weeks. Bar iron is in growing demand, and the orders for structural material and plates run well into 1907. So much has been said on these lines that it is needless to repeat it. Prices are firm at the figures quoted for some time: Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.63½c to 1.73½c; steel bars, 1.73½c; plates, 1.73½c to 1.83½c.

Old Material. — The speculative movement in steel scrap continues, and dealers are willing to pay better prices than the mills, in the expectation of profiting by a still further advance. For wrought scrap the mills are the better purchasers. Between these two elements the entire list has been boosted, with prices ranging about as follows:

Old steel rails	$18.25 to 18.75
No. 1 steel scrap	17.75 to 18.25
Old steel axles	21.00 to 22.00
Old iron axles	28.00 to 28.50
Old iron rails	22.50 to 23.00
Old car wheels	18.00 to 18.50
Choice scrap, R. R. No. 1 wrought	20.50 to 21.00
No. 1 yard scrap	18.50 to 19.00
Machinery scrap	17.00 to 17.50
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	15.00 to 15.50
No. 1 forge fire scrap	14.50 to 15.00
No. 2 forge fire scrap, ordinary	11.00 to 11.50
Wrought turnings	13.00 to 13.50
Axle turnings, heavy	14.50 to 15.00
Cast borings	10.75 to 11.25
Stove plates	13.00 to 13.50

ST. LOUIS.

Small Tonnages Make Up Iron Sales. —Wide Range in Prices.

September 4.

Fears of a runaway market have subsided. While some iron sold as high as $18.50 Birmingham during the week just closed, a belief prevails that the top has been about reached. The market is far from a stable basis, and prices cover a range of $2.50, depending upon delivery. At present no iron can be picked up for delivery within sixty days under $16, while as high as $18.50 is reported for carloads on track in East St. Louis. For the first half of next year $15 is the common quotation. The volume of new business is not large, but on top of the heavy contract orders calling for prompt deliveries, is more than sufficient to keep the furnaces running at full capacity. As a matter of fact no large orders are being placed. The buying today is by the small foundries which always hold off the market until they are satisfied as to industrial conditions. Buying for the first half of next year has not really set in, but the buyers are beginning to "feel the market out." Inquiries for that period are coming in in greater volume, though no large melters have asked about especially heavy tonnage.

Iron quotations for St. Louis delivery within sixty days range as follows:

Southern No. 1	$20.00 to 20.50
Southern No. 2	19.50 to 20.00
Southern No. 3	19.00 to 19.50
Southern No. 4	18.50 to 19.00
Gray Forge	18.25 to 18.50

Coke.—There was a lull in the buying of coke, due largely to the increased price, attributed to the shortage of cars. The price ranges from $6.30 to $6.85, and it is scarce.

Finished Material. — The contract for one hundred tons of corrugated bars for footings for the Butler Bros. building was let to the St. Louis Expanded Metal & Corrugated Bar Co., but it has not been decided whether the building will be of steel or concrete. A new project attracting much interest is the Third National Bank building, which will be 16 stories tall and will require about 2,500 or 3,000 tons of steel.

NEW YORK.

Good Sales in All Lines.—Excitement in Pig Iron Market Subsiding.

Office of THE IRON TRADE REVIEW, Room 1315, No. 150 NASSAU ST., Sept. 4

Pig Iron.—Although the feverish scramble for iron of all descriptions has given place to more normal conditions, still the volume of buying continues to be good. Transactions of the week have involved in the main shipments covering the first half of 1907 at prices somewhat below those prevailing a week or two ago in sales concerning earlier delivery. There is still keen competition for the small amount of spot metal available in the foundry field. A carload lot last Friday brought $23 tidewater. Transactions of this kind are, however, becoming less frequent as the sentiment of the market sobers down.

The most important development of the week was the opening of the Sloss-Sheffield Steel & Iron Co. for No. 2, foundry for delivery during the first half of 1907 at $15, Birmingham, and heavy sales of southern iron which followed. This price at the prevailing freight rates is $19 tidewater and is enough below the quotations for northern iron to insure extensive sales. Sales of Sloss-Sheffield iron alone mounted up to between 15,000 and 20,000 tons in the New York and New England district. The firm most concerned is now said to have orders for more than 50,000 tons for next year.

As a result of these liberal offerings buyers have become more conservative. Very little has been done in either basic or gray forge. Buyers of basic are especially indifferent, either because they are confident that there will be iron enough to go around or because their needs for some time into the future have been supplied. There is still some inquiry for gray forge, but consumption has of late been somewhat curtailed by the strike which has affected nine or ten mills of the eastern bar iron makers.

The coke market has been strong with sales of both furnace and foundry for delivery during the current year at slightly higher prices. Ferro-manganese sales continue moderate with no marked changes in prices.

The following are prices of pig iron at tidewater:

Northern No. 1 Foundry	$19.50 to 20.00
No. 2 Foundry	19.00 to 19.50
No. 2 Plain	18.50 to 19.00
No. 1 Southern Foundry	19.25 to 19.75
No. 2 Southern Foundry	19.00 to 19.50
No. 3 Southern Foundry	18.50 to 18.75
No. 4 Foundry	17.50 to 18.00

Certificates and Standard Contracts.—The market has been a little more active with prices ruling higher. There were no sales of note. The following are quotations for standard foundry contracts on the New York Produce Exchange:

Standard Foundry Contracts.

	Bid.	Asked.
September	18.60	19.00
October	18.50	18.75
November	18.50	18.75
December	18.25	18.75

Finished Iron and Steel.—The market for fabricated steel is beginning to recover from the influence of the summer holiday dullness. In spite of the delays caused by absences during the hot weather, contracts for structural materials placed in August reach a large volume. The American Bridge Co. added to the orders on its books about 50,000 tons and it is estimated that other concerns secured at least twice as much more. The orders placed during the week were numerous, but individually small. Among those secured by the American Bridge Co. were the following: A highway bridge across the Passaic river at Passaic, 800 tons; Baltimore & Ohio terminal at Washington, 800 tons; a building at Pittsburg for the Gauge & Supply Co., 1,400 tons; an open-hearth steel mill for the Andrews Steel Co., in Kentucky, 1,300 tons, an additional 1,500 tons for the building of the Pittsburg Plate Glass Co. Besides these there was an order for a bridge on the Mexican National railroad, about 700 tons; a bridge for the Chicago, Minneapolis, St. Paul & Omaha railroad and the completion of the details of an old contract for 1,250 tons for a building in San Francisco.

Business in steel rails concerned chiefly the immense contracts placed in the past months, but there were a few new orders. Among others were the following, nearly all for delivery in 1907. The Southern railway, 15,000 tons additional; Chicago & Western Indiana, 3,000 tons; Lake Shore Elevated, 2,300; New Orleans & Northwestern, 1,000 tons; Vicksburg, Shreveport & Pacific, 2,000 tons; Alabama & Vicksburg, 1,500 tons; The Brooklyn Heights railway, 1,325 tons and Southern Indiana, 600 tons additional.

Trade in steel plates has been very satisfactory although of a routine character. The contract for riveted pipe for the Philadelphia water department mentioned last week is still subject to the decision or decisions of the city authorities. Bar iron has been somewhat less active. Strikes are interfering with the normal movement of the product.

The following are prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.69½c to 1.74½c; soft steel bars, 1.64½c to 1.74½c; sheets, No. 28 black, 2.50c.

Old Materials.—Efforts of the brokers to boom the market have failed to excite the interest of the chief buyers who seem determined to discount all upward tendency by holding aloof in a body. Dealers have eagerly taken such supplies as appeared. Prices have been extremely irregular, in certain special cases ruling very high. There has been a moderate amount of buying by bar mills. The following are prices approximately f. o. b. tidewater:

Old iron rails	$23.00 to 23.50
Old steel rails, long lengths	16.00 to 16.50
Old steel rails, short pieces	15.00 to 15.50
Relaying rails	25.00 to 26.00
Old car wheels	17.00 to 18.00
Old iron car axles	26.00 to 26.50
Old steel car axles	19.00 to 20.00
Heavy melting steel scrap	15.00 to 15.50
No. 1 railroad wrought scrap	18.00 to 18.50
Iron track scrap	16.00 to 16.50
Wrought pipe	12.50 to 13.50
Cast borings	10.00 to 10.50
Wrought turnings	12.50 to 13.75

BIRMINGHAM.

Three Distinct Iron Prices Based on Time of Delivery.

September 3.

Three prices are quoted for pig iron in the Birmingham district. The product that is to be delivered within thirty days brings $16 per ton, No. 2 foundry, and more. Special brand iron as well as special analysis iron brings but a little more. Iron to be delivered within three months commands $15.50 per ton, No. 2 foundry basis. Iron for delivery during the first quarter of the coming year is bringing from $15 to $15.50 per ton. Despite statements to the contrary, there appears no inclination on the part of consumers to hold aloof from the market in anticipation of a lower price. Southern manufacturers continue to receive a lively inquiry for the product and all indications are that there is need for a large quantity of iron. Some of the companies in this section are said to be still delivering on iron sold at the low prices, while in other instances some companies are "buying" iron from one another in order to fill orders. There is delay in some quarters in filling orders though the railroads are doing everything in their power.

One furnace went into blast during the past week, the Little Belle furnace at Bessemer (Tennessee Coal, Iron & Railroad Co.), and two others are due

to blow in before the end of this month. There is still an anxiety to put in as many furnaces as possible but care is being taken on account of the supply of raw material, the ore mines being worked hard in order to meet all demands. The coke supply is improving and as far as can be ascertained there is no trouble in this regard. While the iron production was off a little there was an accumulation of ore, but this has been worked down and now the demands are being met only as the material can be produced. Improvements are being made at ore mines and further development is under way in this state, so that ere long it is believed conditions will be easier.

CINCINNATI.

Less Active Market With Fair Inquiry.—High Spot Iron Prices.

September 5.

The market is somewhat less active than for the past two or three weeks. Still a fair volume of business and some inquiry is pending. Spot iron continues scarce and brings premium prices, southern iron having sold as high as $17.00 Birmingham and northern as high as $19.00 at furnace. These figures are extreme, however, and prompt shipment of iron is obtainable at $16.00 Birmingham. There has been a good inquiry for malleable for delivery in this year with limited offering. Southern iron for the balance of this year is quotable at $15.50 to $16.00 Birmingham with most furnaces holding at the latter price. For the first quarter of next year, southern iron has sold on a basis of $14.75 Birmingham, but this price was withdrawn at the close of the week and the southern market is now quotable at $15.00 Birmingham for the first quarter. Northern iron in southern Ohio is quotable at $17.75 to $18.00 at furnace for the first quarter of next year, with practically nothing offered for the balance of this year. Gray forge is quiet and but little inquired for. We quote f. o. b. Cincinnati for last quarter delivery.

Southern Foundry No. 1	$19.00 to 19.50
Southern Foundry No. 2	18.50 to 19.00
Southern Foundry No. 3	18.00 to 18.50
Southern Foundry No. 4	17.50 to 17.75
Southern Foundry No. 1, soft	19.00 to 19.50
Southern Foundry No. 2, soft	18.50 to 19.00
Gray Forge	16.25 to 16.75
Northern Foundry No. 1	19.40 to 19.90
Northern Foundry No. 2	18.90 to 19.40
Northern Foundry No. 3	18.65 to 19.15
Jackson County Silvery, 8 per cent	23.15
Southern Charcoal	25.50

Finished Materials.—The market is active with jobbing interests reporting a good demand, largely accounted for by the fact that mill deliveries are becoming more delayed on a number of lines.

We quote: Bars at 1.73c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets No. 10 and No. 12, in car lots are 2.68c. We quote black sheets, No. 27 at 2.53c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.70c; No. 16, 2.25c; No. 14, 2.20c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2c to 2.10c for ¼-inch and 2.10c for 3-16 Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

Coke.—The market is very active and firm at the following quotations:

Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke on contracts	3.25 per ton
Pocahontas Furnace Coke prompt shipment	$1.85 to 2.25 per ton
Pocahontas Foundry Coke on contracts	2.75 to 2.85 per ton
Connellsville Furnace Coke prompt shipment	2.50 to 2.85 per ton
Connellsville Foundry Coke on contracts	3.50 to 3.65 per ton
New River Foundry Coke on contracts	3.00 to 3.25 per ton
New River Furnace Coke, prompt shipment	2.25 to 2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 to $1.70 per ton on $9.00 pig iron, plus 17 percent of the advance on pig iron above $9.00 Birmingham.

Old Material.—In keeping with the improved tone of the iron market, scrap is considerably stronger and prices have advanced generally. We quote, f. o. b. Cincinnati:

Old No. 1 railroad wrought, net tons	$16.00 to 16.50
Cast machine and foundry, net tons	14.00 to 14.50
Old iron rails, gross tons	23.50 to 24.00
Old steel rails, gross tons	17.50 to 18.00
Old short lengths, gross tons	17.00 to 17.50
Old iron axles, net tons	23.00 to 24.00
Heavy melting scrap, gross ton	18.50 to 19.00
Stove plate, net tons	10.50 to 11.00
Wrought turnings, net tons	10.00 to 10.50
Cast borings, net tons	7.50 to 8.00
Car wheels, gross tons	17.00 to 18.00

CHICAGO.

Car Shortage Delays Deliveries. — Prices Firm and Market Active.

Office of THE IRON TRADE REVIEW, 1762 Monadnock Block, Sept 4

The market is pitched to a high key, but there is no weakening in the tone. In every direction conditions are firm as adamant. Specifications keep their lively pace, and new inquiry shows no signs of diminishing. Consumers are clamoring as wildly as ever for material; but are making no more strenuous efforts to get it than producers are to ship it to them. Unlooked for difficulties are continually arising to add to the trials of manufacturers and delay the completion of contracts. Early in the summer, it was a labor scarcity in pig iron producing regions; then followed a steel shortage; now it is a car famine. The latter is a usual occurrence each autumn, but it bids fair to be more acutely felt this year by reason of the unparalleled activity in all manufacturing lines and the greater demand for cars. The American Steel & Wire Co. was short 75 cars last week; other makers suffered, but in a less degree. The only price changes this week are in pig iron and coke, the former having been advanced 50 cents a ton for all deliveries, and the latter 25 cents a ton. Several good sized sales were closed, one being for 6,000 tons of Virginia basic with the American Steel Foundries for delivery in the first quarter of next year. The deluge of scrap which the recent high prices on this product brought out has halted the advancing tendency, and the market is more stable than it has been in several weeks. The Illinois Steel Co. started its new furnace at Joliet last Saturday. This stack will have an output of 500 tons a day, the whole of which will be applied to steel making irons.

Pig Iron.—The scarcity of desirable grades of pig iron for shipment this year grows more pronounced each week. In proportion to the failure of southern furnaces to supply their customers the iron due on contracts, has the demand for spot shipment increased. Quite a number of foundries have not received their August quota, or any portion of it, and many of them are on the verge of having to shut down, being saved from this alternative only by securing odd carlots from day to day. Prices are rising steadily, an advance of 50 cents a ton being made this week in all foundry grades, northern and southern, for delivery this year or in 1907. Alabama irons are now at a minimum of $16.50 Birmingham, for No. 2 foundry for delivery this year, and at $15.50 for 1907 shipments; while northern No. 2 is held at $20 Chicago, for prompt shipment, and $19.50 for forward deliveries. Transactions this week were numerous, but they involved with one or two exceptions lots less than 1,000 tons. Lake Superior charcoal and malleable Bessemer are scarce and prices on both were advanced this week. The south is being cleaned up on low grade irons, and for what can be obtained, $17.40 Chicago, is the minimum quotation ruling. We have revised our prices, and quote as follows:

Lake Superior charcoal	$20.00 to 20.50
Northern Foundry No. 1	20.50 to 21.00
Northern Foundry No. 2	20.00 to 20.50
Northern Foundry No. 3	19.50 to 20.00
Northern Scotch Foundry	20.50 to 21.00
Ohio Strong Softeners No. 1	20.30 to 20.80
Ohio Strong Softeners No. 2	19.80 to 20.30
Southern Foundry No. 1	19.90 to 20.40
Southern Foundry No. 2	19.40 to 19.90
Southern Foundry No. 3	18.90 to 19.40
Southern Foundry No. 4	18.40 to 18.80
Southern No. 1 Soft	19.90 to 20.40
Southern No. 2 Soft	19.40 to 19.90
Southern Gray Forge	17.40 to 17.65
Southern Mottled	16.90 to 17.40
Southern Silveries (4 per cent to 6 per cent Silicon	
Jackson Co. Silveries, 8 to 10 per cent Silicon	24.30
Alabama and Georgia Car Wheel	25.65 to 26.15
Malleable Bessemer	20.00 to 20.50
Standard Bessemer	20.55
Basic Iron	19.85 to 20.05

Rods and Billets.—There is little, if any change in the situation on crude steel. Rods and billets are very scarce and prices are stiff. Only regular customers can get accommodations from local mills, and these are limited to occasional carload lots. Prices are without change, sheet bars being held at $30 Pittsburg; forging billets $36 Chicago, and wire rods $34 Pittsburg.

Iron and Steel Bars.—Specifications on these products continue very heavy. The congestion is particularly severe on agricultural steel shapes, the abnormal demand and scarcity of steel both operating to the consumers' disadvantage. With a famine of cars on the horizon as a result of the movement of crops, it will be months before shipments will equalize demand, a fact which will doubtless end in an era of premium paying. Local mills are making strenuous efforts to overcome the steel shortage, and with increased pig iron capacity available at an early date, some improvement will soon be made in this condition. New bar iron tonnage is brisk, although none of the local plants are getting 1.60c Pittsburg for their product in this market. The best that can be done is 1.55c Pittsburg. We quote on the basis of carload lots, Chicago delivery, as follows:

Sheets.—The advance of $1 a ton in blue annealed sheets, mentioned last week, does not come up to the wishes of independent makers. Most of them had anticipated an advance in box annealed as well as in galvanized sheets, and are visibly disappointed that these products were not included. They are confident that this change cannot be postponed much longer in view of the overwhelming demand and scarcity of sheet bars, and are conserving their output in anticipation of the advance. The relationship between supply and demand remains much the same as it has been for months past. All special prices have been withdrawn, and in some instances $1 a ton higher than the Pittsburg schedule is asked. The new sheet mill at Atlanta, Ind., was started up last week, and in order to obtain prompt specifications, the company is reported to be giving away the difference in freight rate between Pittsburg and Atlanta, making the price for No. 28 gauge black, $2.56½ Chicago. Our quotations on carload lots, mill shipments, Chicago delivery, are as follows:

Black sheets, Nos. 8, 9 and 10 1.85c. Pittsburg; No. 28 gauge, 2.50c Pittsburg. Galvanized sheets, No. 28 gauge, 3.55c to 3.60c Pittsburg. Freight to Chicago is 16½c per 100 lbs.

Jobbers' prices on less than carload lots, from local store, are as follows: Black sheets, No. 10, 2.30c; No. 12, 2.35c; No. 14, 2.40c; No. 16, 2.50c; Nos. 18 and 20, 2.70c; Nos. 22 and 24, 2.75c; No. 26, 2.80c; No. 27, 2.85c; No. 28, 2.90c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.15c to 3.25c; Nos. 22 and 24, 3.30c to 3.35c; No. 26, 3.50c to 3.55c; No. 27, 3.70c to 3.75c; No. 28, 3.90c to 3.95c; No. 30, 5.10c to 5.15c.

Plates. — Shipments of plates are nearer to specifications than any other product. While the local mills are crowded with tonnage, eastern manufacturers are not so tightly sold ahead and from these interests shipments can be obtained of either sheared or universal sizes within two to three weeks. New tonnage is of fair proportions and prices are firmly maintained, mill shipments being quoted as follows: Tank steel, ¼ inch and heavier, up to 100 inches wide, 1.60c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago is 16½c per 100 pounds.

Jobbers' prices for shipment from local stocks are as follows: Tank steel ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches up to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch, 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Cast Iron Pipe.—The only letting of importance last week was the Milwaukee contract for 327 tons, which went to United States Cast Iron Pipe & Foundry Co.; St. Louis, Mo., is in the market for 2,500 tons, the contract for which will be awarded this week. Routine demand is good, and prices are very firm. We quote for Chicago delivery, as follows: Four-inch water pipe, $33; 6, 8, 10 to 12-inch pipe, $32; larger sizes, $31; gas pipe $1 extra.

Merchant Pipe.—Specifications are very active and prompt shipments are being made by mills. Jobbers report a good demand from stocks. Prices are strong but without change. We quote on the base sizes, ¾ to 6-inch black steel pipe, 79.35 per cent discount, and 69.35 per cent discount for galvanized pipe. Quotations on material from stock remain at 76 to 77 per cent discount on the base sizes.

Boiler Tubes.—There is no semblance of weakness in tubes. Schedule prices are uniformly maintained. Demand is brisk and jobbers have difficulty in keeping their stocks replenished. Prices are unchanged as follows: 2¾ to 5 inches, steel, 68.35; iron, 55.35. Seamless tubes, 2¾ to 4½ inches, 50.85. Less than carload lots, from store, are on base sizes, steel, 60; iron, 47½; seamless steel, 42½.

Structural Steel.—Contracting for structural shapes this week has been very largely for bridge construction. Jobbing shops and fabricators are specifying heavily, anticipating their future requirements in order to insure the material being in storage. Deliveries are slow, especially of the lighter sizes. We quote mill prices as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg; freight rate to Chicago is 16½c per 100 pounds. See Pittsburg report for extras.

Quotations on lots from store are as follows: All angles three inches and larger, including six inches, $2.25 per 100 pounds base; angles over six inches, $2.35 per 100 pounds base; tees, three inches and larger, $2.30 per 100 pounds base; beams, three inches to fifteen inches, inclusive, $2.25 per 100 pounds base; beams, eighteen inches and larger, $2.35 per 100 pounds base; channels, three inches and larger, $2.25 per 100 pounds base.

With the completion of the new blast furnace at Joliet, the engineering force of the Illinois Steel Co. has made another record for itself. Just seven months and nine days ago it was definitely decided to build this stack, and in that interval designs were made, contracts awarded, and the furnace erected. It was blown in Saturday, Sept. 1.

Rails and Track Supplies. — New rail tonnage is comparatively light. A number of small inquiries are under consideration, but owing to the impossibility of making the required deliveries it is doubtful if they will develop into orders. Track supplies are firm and in active demand. On contracts for spikes and bolts when accompanied by rail orders, the Illinois Steel Co. is asking 2.10c to 2.20c for spikes, and 2.45c to 2.55c for bolts. On miscellaneous business from the general trade, however, other manufacturers are asking 2.45c Chicago, for spikes, 2.85c for bolts with square nuts, and 3c for bolts with hexagon nuts. Angle bars are held at 1.50c to 1.75c, according to the tonnage and delivery required.

Bessemer, $28 and open-hearth $29; light rails, Bessemer steel, 30 to 45-pound sections, $29 to $30; 25-pound, $30 to $31; 20-pound, $31 to $32; 16-pound, $32 to $33; 12-pound, $33 to $34 and lighter sections, down to 8-pound, $39.50 to $41.50, all f. o. b. mill.

Merchant Steel.—Mills continue to fight shy of new business. All of them have sold their capacity to July next, and are not desirous of adding to the present burden of specifications. Under the circumstances, deliveries are fairly good, although complaints on this score

are heard here and there. Prices are without change, mill shipments, Chicago delivery, being as follows.

Planished or smooth finished tire steel, 1.86½c; iron finish, up to 1½ x ½ inch, 1.81½c; iron finish, 1½ x 1½ inch and larger, 1.66½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.16½c, and 1⅛ inch and larger, 2.06½c; smooth finished machinery steel, 1.91½c; flat sleigh shoe, 1.71½c; concave and convex sleigh shoe, 1.96½c; cutter shoe, 2.35c; toe calk steel, 2.21⅛c; railway spring, 1.86½c; crucible tool steel, 6½c to 8c, and still higher prices are asked on special grades. Shafting, 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Wire Products.— August sales by the American Steel & Wire Co. were heavier than for any previous month this year, approximating nearly 250,000 tons. The company is not making shipments in proportion to the tonnage booked, however, being handicapped by a shortage of steel as well as difficulty in getting cars. Jobbers are clamoring wildly for material that their stocks may be replenished before the harvesting season is over. The company is doing its utmost to meet this pressing need, but under the conditions that exist it has to divide its output where it is most needed. Prices are very firm, but without change. We quote to jobbers, Chicago delivery, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Coke. — Standard brands of Connellsville foundry coke are now selling at a minimum of $3.25 ovens, or $5.90 Chicago. This advance was made Saturday last at the close of a very busy week of contracting. Requirements are now being covered through the greater part of 1907. Local by-product coke strengthens in unison with the Connellsville product, and is quoted on the same basis. Virginia grades are still offered at $2.75 to $3, ovens.

Old Material. — The manipulations of local dealers are gradually forcing prices to higher levels. Another advance, almost general, of 50 cents a ton, has been made this week. Several products are scarce, particularly car wheels, iron rails and cast scrap, and it is difficult to record the market on these, as each transaction is almost a law unto itself. More large melters are coming into the market for material and it begins to look as though a sound buying movement was not far away. All the railroad lists mentioned last week were disposed of at good prices; the only new list out this week is that of the B. & O. for 2,500 tons. The Inland Steel Co. has not yet bought all its requirements, but is making higher bids for material than it did a week or ten days ago. We have revised our prices, and quote as follows:

Old Steel Rails (4 feet and over)	$17.50 to 18.00
Old Steel Rails (less than 4 feet)	16.00 to 17.00
Old Car Wheels	19.50 to 20.00
Old Iron Rails	23.50 to 24.00
Relaying Rails, subject to inspection	28.00 to 30.00
Heavy Melting Steel	16.00 to 16.50
Mixed Country Steel	13.50 to 14.00

We quote net tons, as follows:

No. 1 R. R. Wrought	$17.50 to 18.00
No. 2 R. R. Wrought	16.00 to 16.50
Shafting	17.00 to 17.50
Dealers' Forge No. 1	13.50 to 14.00
Wrought Pipe and Flues	11.50 to 12.00
No. 1 Cast, 150 pounds and less	15.00 to 15.50
No. 1 Mill	10.00 to 10.50
Mixed Busheling (No. 1 & No. 2)	11.50 to 12.00
Country Sheet	8.00 to 8.50
No. 1 Boilers Cut	10.50 to 11.00
Boiler Punchings	14.50 to 15.00
Iron Car Axles	24.00 to 24.50
Steel Car Axles	20.00 to 20.50
Iron Axle Turnings	10.00 to 10.50
Cast Borings	8.50 to 9.00
Mixed Borings, etc.	8.50 to 9.00
Machine Shop Turnings	9.50 to 10.00
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.00 to 14.50
Stove Plate and Light Cast Scrap	12.75 to 13.25
Old Iron Splice Bars	19.00 to 19.50

Charles M. Schwab says the Bethlehem Steel Co. is now employing 20,000 men. The additions and improvements of the steel plants are progressing satisfactorily. Mr. Schwab calculates that in a year some of the new plants will be ready to begin operations, making the company a producer of other lines of finished steel than armor plate, fragment forgings, and other special lines upon which it is now engaged.

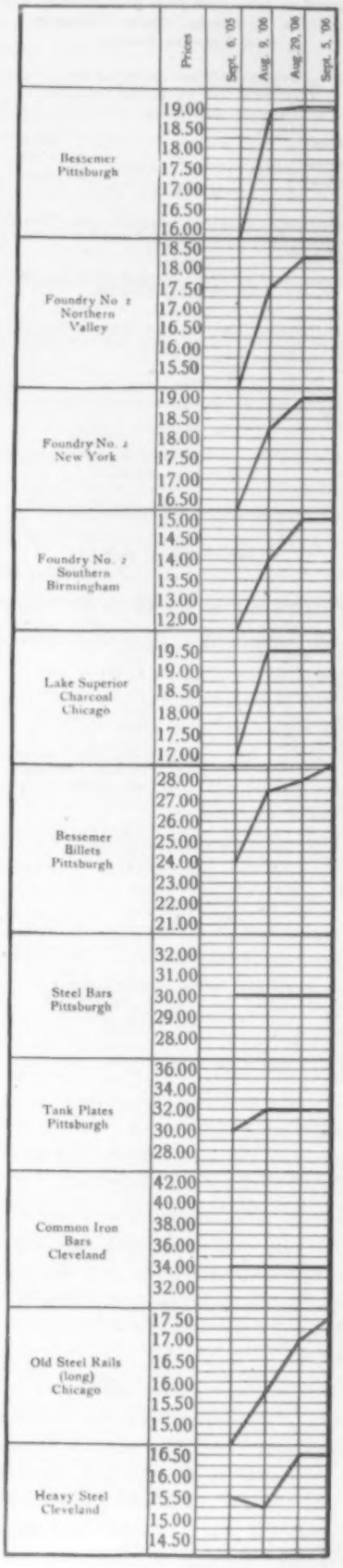
The works of the Pennsylvania Steel Co., at Steelton, have been making a very heavy output, the August product being larger than for some time. The company has taken a number of good bridge contracts, including the Scherzer bridge for the New York, New Haven & Hartford Railroad Co., at New York.

The Phoenix Iron Co. is rushing the improvements to its plant in Phoenixville, Pa., because of the large orders taken for this winter and next year. The steel mill is being rebuilt in some portions, and other improvements will add about thirty per cent to its output.

It is said that the Tacony Iron Co., which was recently incorporated by Edgar A. Custer, John B. Stevenson 3rd., and others, of Philadelphia, will absorb the Durham Iron Co., owning the furnace at Reiglesville, and the Quakertown & Eastern Railroad Co. Both will be operated.

PRICE CHART.

(Pig Iron Quotations are For Delivery During First Half of 1907)



THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

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FAULTS OF A CENSUS REPORT.

We publish this week an extended summary, specially prepared, of the census report on rolled iron and steel. This report contains much valuable information, but some of the census bureau's methods are, we believe, open to adverse criticism.

The grouping of products by the bureau in its preliminary statement for rolling mills and steel works shows either bad judgment or lack of knowledge of the statistical data which the iron and steel manufacturers desire. For instance, the bureau combines the production of wire rods and merchant bars. As neither product bears the slightest resemblance to the other, wire rods being sold in coils and used almost wholly in the manufacture of wire for mattresses, field fencing, nails, chains, and in the hundred and one forms into which wire is now manufactured, and merchant bars and rods being sold in the form of flats, rounds, ovals, squares, etc., and made into bolts, nuts, carriage axles, etc., it is rather difficult to conceive just what induced the bureau to make this rather incongruous classification and to thus detract from the usefulness and value of its work. The bureau has also combined steel ingots produced for sale, a crude and unfinished product, with steel castings, a wholly finished product. As the steel casting industry today is growing rapidly, and as the production of steel ingots for sale is a matter of but small importance, virtually all of the ingots so produced being reported to the census office when rolled or forged into finished forms, the reasons for the consolidation are not at all clear. As the value of the steel castings produced in 1904 amounted to $20,000,000 or $25,000,000 it certainly would seem that an industry of this magnitude is worthy of special recognition by the census bureau.

The summary covers the essential features of the preliminary statement of the census bureau for our rolling mill and steel works industries for the calendar year 1904. When the final report of the bureau is issued, it will doubtless contain much information of value concerning the drawing of wire and the manufacture of cut and wire nails, bolts, nuts, rivets, chains, wrought pipe, etc., etc., by rolling mill establishments. If the bureau could be induced to issue its reports more promptly, they would be more highly appreciated by manufacturers generally. In all probability the full report of the bureau on our iron and steel industries for 1904 will not be ready for distribution much before the end of 1906, or about two years after the close of the year which it covers. Even the preliminary report of the bureau on iron and steel for 1904 was not made public until some twelve or fourten months after very comprehensive figures for the same branches of the iron and steel industries had been published by the American Iron and Steel Association.

While it is perhaps expecting too much for a government bureau to collect statistical information as expeditiously as a private organization, it should at least be possible for the census bureau, with its host of special agents, to publish complete reports on the special mining and manufacturing industries for which it collects statistics in not more than twelve months after the close of the year covered by its reports. In this pushing age business men are taking more interest year by year in statistics relating to our mining and manufacturing industries. But they justly insist upon having prompt information concerning these special lines, and it is but natural that they should evince only passing interest in statistical information —no matter how full and complete it may be—which reaches them some two or three years after the time that it would doubtless have been of great assistance to them in pointing the way to the possible future consumptive demands of the country. The division of mining and mineral resources of the United States Geological Survey publishes annually the production of iron ore, coal, coke, and several other leading industries in from eight to ten months after the close of each calendar year. Surely it should be possible for the census bureau to publish complete statistics for the special mining and manufacturing industries for which it collects information in not more than twelve months after the close of the year covered by its inquiries. The bureau is now a permanent feature of the department of commerce and labor; it has a large force of trained statisticians and clerks at its command, and it should therefore be a comparatively easy task for it to give full and complete information for all our large mining and manufacturing industries in not more than a year from the close of any given period. As now conducted the full reports of the bureau for these industries frequently do not reach the public until long after it has received almost identical information from the geological survey or from some up-to-date private statistical organization. It is unfortunate, too, that the bureau should have headed its statistics "1905" when the period really covered is for the calendar year 1904, thus confounding a "lean" year in the iron and steel trade with one of the "fattest" years the trade has ever known.

THE CROPS AND IRON MARKET ACTIVITY.

Here and there is manifested a disposition to look askance at the wonderful buying movement in iron and steel products which has characterized

July and August this year. Certainly in no previous year within the memory of the present business generation has there been such a movement. The years 1899 and 1902 saw great midsummer activity in buying, but that was simply a continuance of what had been going on throughout the earlier months of the year. This year the active midsummer market was preceded by a period of relative quietness, so that it represented a distinct movement.

Such widely different factors have contributed to create this movement that according to the temperament of the individual quite opposite views may be formed regarding the soundness of its foundation and the prospects of the continuance of the conditions thus brought about. There are some, distinctly a minority, who fear that there has been too much precipitancy, and expect a reaction. There are others, probably constituting a majority, who feel that what has occurred has been entirely justifiable, but that the market needs protection from itself, and that the greatest prudence must be exercised by sellers who are in position to influence prices, to prevent advances in any direction which may tend to increase the excitement of buyers.

There have been two distinct parts to this general buying movement, one a buying of pig iron and the other a buying of finished steel products. In semi-finished material there has been little movement, as the market was covered with long time contracts. The pig iron buying has been caused partly by the scarcity of spot iron and partly by the prospects of a shortage of iron ore. The scarcity of prompt iron was due in part to the fortuitous circumstances that an unusual number of furnace linings gave out at about the same time, and the great humidity decreased materially the output of the active furnaces. This does not, however, account entirely for the scarcity of iron, especially foundry grades, as foundries have been extremely busy and in many cases have melted more than they had estimated, thus being compelled to supplement their contracts by buying of spot iron. As concerns the prospective scarcity of iron ore, on the other hand, the fears of an insufficient supply in the future were reasonable and legitimate. The Lake Superior iron ore movement will fall far short of the estimates made before the season opened, and short also of estimates based upon the shipments made during the fore part of the season movement.

The buying of finished steel products rests upon what has always been the most substantial basis possible in the American iron trade, since it can be referred directly to the prospects of good crops. An examination of details points to this most clearly. Two cases, of steel bars and wire products, will be taken.

The steel bar market was distinctly weak in the middle of the second quarter. In April a special concession was made to the agricultural implement makers, and in the following month there was shading to other buyers by at least one large maker. The steel bar market was distinctly unsatisfactory, compared with that existing in most other finished steel products, but the agricultural implement manufacturers resumed work in their plants early in July, this being the earliest commencement of their manufacturing season on record. Specifications on steel bar contracts were very heavy and the market became very strong. This position was created solely by the prospects of very good buying power in the agricultural sections of the west. There are no better means of gathering advance information than those possessed by the agricultural implement makers. While the government and other crop reports indicate the prospects of yield of the soil, the implement makers go farther and ascertain the buying power which will result from the crops. Following a series of poor crops a good one may furnish money which will not be expended so largely in new purchases, but will be used, for instance, in paying off loans.

In the wire trade it has been the custom in recent years to restrict production during the summer months by a definite percentage of normal mill output. Such a policy was carried out with distinct success in 1904 and 1905, and was in process of execution this year when it developed that demand for wire products was so heavy that no regulation would be needed. The wire mills have been operated as fully as the supply of steel would permit, yet stocks are unusually low for the season, and orders each week are in excess of mill capacity. The demand has come very largely from the west and northwest, and distinctly has the crop prospects as its basis.

In these two lines, steel bars and wire, which are keynotes to the crop prospects, the demand has been strikingly large. It has had much to do with the scarcity in crude steel. The steel bar mills and rod mills have taken a much larger proportion of the July and August output of crude steel than they usually do, and have thereby limited the supply going to other branches of the finishing trade, such as plates, shapes and sheet products. Steel finishing capacity is always in excess of steel producing capacity, as all lines cannot be expected normally to be equally busy, and when all are busy, the steel supply must be pro-rated.

Much of the late buying of pig iron, particularly southern iron and northern malleable Bessemer and basic, has rested upon the same foundation, a demand from the agricultural implement makers based upon prospects of very large buying capacity in the great agricultural sections.

It is true that railroad buying rests largely upon crop prospects, but railroad purchases are largely "financed" and depend partly upon an intermediate influence, the condition of the money market. The purchases of the agricultural sections are not "financed" in this sense, but are made with money practically in hand. Although the recent buying of pig iron may be open to criticism in some cases, it must be conceded that the buying of finished steel products has rested upon the most substantial prospects

which are possible in the American iron trade.

WHEREIN STOCKS REFLECT PROSPERITY.

Criticism has been freely directed of late to the failure of those securities heavily dealt in on the leading exchanges to reflect in its fulness the remarkable prosperity now enjoyed by almost our entire range of industries. By reason of the deliberate manipulation of certain securities in the interest of the professional trader, this unfavorable comment has in some measure been merited, but for the most part it has been unjust because untrue. It is a fact that market values have reflected increased activities in a fairly accurate manner. Where the critics have erred has been in looking for advances in preferred securities, which, being for the most part already well established on an equitable dividend basis, are affected by periods of activity or depression in much less degree than are their common stocks.

By way of illustration; a year ago the iron and steel industry was rounding out a record season and was just coming into a realization of the fact that trade conditions were destined to improve rather than lose ground. Today the industry is even more active with prospects at least equally bright, but a comparison of the quotations of Sept. 1, 1905, on a representative list of preferred securities in this line, with those of Sept. 1, 1906 shows relatively little change, as follows:

	1905.	1906.	Change.
Am. Car & Fdy.....	100½	101	+ ½
Am. Loco.	112¾	113	+ ¼
Am. Shipbldg.	105	107	+ 2
Bethlehem St.	88	88	....
Crucible Steel	64	80¼	+15¾
Pres. St. Car	95½	97½	+ 2
Rwy. St. Spg.	99	100¼	+ 1¼
Rep. I. & S.....	88⅞	99⅛	+10⅛
U. S. P. & Fdy.....	91¾	91	— ¾
U. S. Steel	103⅝	106⅞	+ 3¼

With two exceptions where the improved conditions have made possible a resumption of dividend payments allowed to lapse during the trying times of the years previous, the general level of prices is practically the same. These stocks were already paying dividends, there was little possibility of the rate being increased, and the slight advance noted in most instances is accounted for by recent plant betterments and by greater accumulations of surplus.

With most common stocks, however, the situation is radically different, as the following table of comparative prices shows.

	1905.	1906.	Change.
Am. Car & Fdy.....	35¾	40	+ 4¼
Am. Loco.	50	71¾	+21¾
Am. Shipbldg.	52½	61¾	+ 9¼
Beth. Steel	31¼	25½	— 5¾
Crucible Steel	12½	13⅝	+ ⅛
Pres. St. Car	43¾	53½	+ 9¾
Rwy. St. Spg.	36½	54	+17½
Rep. I. & S.....	20½	29¾	+ 9¼
U. S. P. & Fdy.....	30½	47	+16½
U. S. Steel	36¼	46⅛	+ 9⅞

Almost without exception a considerable advance is noted. In some cases this has been due to the resumption of dividend payments or their initial declaration; in others it reflects the belief that the stock, though never before in that select class, will shortly be made dividend-bearing by reason of increased earnings and surplus. Crucible Steel common has failed to keep pace with the general advance because that concern's share of prosperity has gone into the payment of deferred dividends on the preferred. Republic common, on the other hand, has netted a large gain even while clearing off its cumulative indebtedness. All these, however, are only varied phases of the same situation; the point is that it is the common stock which is most sensitive to changing industrial conditions.

INDULGING IN PROPHECY

The *American Metal Market's* Pittsburg correspondent says: "We believe that the excitement in pig iron in the past month was largely gratuitous; that the advances in price in many cases were not warranted by fundamental conditions and that if buyers had been more conservative their iron would be costing them less money and they would be getting it just the same. We believe that pig iron production, both north and south, and particularly in Alabama, is going to very materially increase, beginning with the month of September; that producers who have gone out of the market because sold up or because they desire to be considered sold up, will come back into the market before the end of the year, for deliveries in this year, and that barring the accidents of a railroad blockade interrupting coke movement, or an early closing of lake navigation cutting short the supply of iron ore, the pig iron market will be noticeably easier in the last three months of the year than it has been in the past two weeks. We believe that before the end of this year there will be a change in sentiment in the iron trade for the worse, which will be blamed upon Theodore Roosevelt, congress, Wall street, the elections and the public desire to curb the corporations, and that as the present glut of orders for finished steel products runs out it will become increasingly difficult to replace them, with a steady decline in optimism until a real depression, like that of 1903, in intensity (though not necessarily as to prices) strikes the trade and is first seriously felt about midsummer of 1907. We think finally that the present moment marks the most prosperous time the American iron trade will see until after next presidential election, taking prosperity in the general sense of furnaces and mills being engaged to full capacity and sold up far ahead."

THE WILY JAPS.

Editor THE IRON TRADE REVIEW:

We read with much interest your editorial on Japan and eastern trade. There is no question that you have hit the nail on the head. The Japanese have been working for Japan, and they will not only be strong competitors in the far east, but, in our judgment, the day will soon come when they will give us a good hard run at home. They are capable, industrious and beat the Americans in deceiving. We have not the slightest doubt, and never have had, that the Chinese boycott was planned and executed through the Japanese. They will not be quite as honest as we have supposed.

Cleveland, Aug. 30. C. O. BARTLETT.

Carborundum Plant for Germany.—The Carborundum Co. of Niagara Falls has begun construction work on a large branch plant in Germany. Five kilns for the manufacture of vitrified wheels are provided for, two of these to be built at once. The buildings are entirely of concrete, fireproof construction and the plant when completed will embody all of the latest and most improved machinery for the manufacture of abrasive materials. It is expected the new works will be in operation by Jan. 1.

The plant of the Chesapeake Nail Works at Harrisburg, Pa., which has been idle for about two and a half months, will be started shortly. The shear gang went to work this week and the puddlers will go on later.

INCREASED PRODUCTION

By Independent Companies Compared with the Steel Corporation.

The accompanying table, which the American Iron & Steel Association has compiled from reports received by it directly from iron and steel manufacturers, gives the percentage of production of all leading iron and steel products by the United States Steel Corporation and by independent companies in the four calendar years, 1902, 1903, 1904, and 1905. It also gives for the same years the percentage of shipments by the corporation and by the independent companies of iron ore from the Lake Superior region and the percentage of the total production of iron ore and coke in the whole country by the corporation and by the independent companies. Statistics of the total shipments of iron ore from the Lake Superior region are collected by THE IRON TRADE REVIEW and statistics of the country's total production of iron ore and coke are from the publications of the division of mining and mineral resources of the United States Geological Survey. The corporation has reported its share of these shipments and production.

Products of the United States Steel Corporation and of Independent Companies.	1902.		1903.		1904.		1905.	
	Corporation.	Independents.	Corporation.	Independents.	Corporation.	Independents.	Corporation.	Independents.
Shipments of iron ore from the Lake Superior region	60.4	39.6	58.8	41.2	53.8	46.2	56.0	44.0
Total production of iron ore	45.1	54.9	43.8	56.2	37.9	62.1	43.4	56.6
Production of coke	37.4	62.6	34.2	65.8	36.5	63.5	37.9	62.1
Bessemer, basic, and all other kinds of pig iron	44.3	55.7	39.9	60.1	44.3	55.7	43.8	56.2
Spiegeleisen, ferro-manganese, ferro-phosphorus, etc.	81.0	19.0	81.0	19.0	70.5	29.5	74.9	25.1
Total pig iron, including spiegel., ferro-mang., etc.	44.7	55.3	40.4	59.6	44.6	55.4	44.2	55.8
Bessemer steel ingots and castings	73.9	26.1	72.0	28.0	69.0	31.0	67.4	32.6
Open-hearth steel ingots and castings	52.4	47.6	51.0	49.0	50.4	49.6	51.4	48.6
Total Bessemer and open-hearth ingots and castings	65.7	34.3	63.5	36.5	61.0	39.0	60.2	39.8
Bessemer steel rails	65.4	34.6	65.6	34.4	57.2	42.8	53.6	46.4
Structural shapes	57.9	42.1	60.3	39.7	55.1	44.9	54.6	45.4
Plates and sheets, excluding nail plate	59.4	40.6	59.9	40.1	58.0	42.0	57.4	42.6
Wire rods	71.5	28.5	73.1	26.9	71.3	28.7	69.9	30.1
Bars, skelp, nail plate, open-hearth and iron rails, etc.	31.1	68.9	29.8	70.2	28.6	71.4	31.0	69.0
Total of all finished rolled products	50.8	49.2	51.2	48.8	47.8	52.2	47.3	52.7
Wire nails	64.8	35.2	70.6	29.4	67.0	33.0	66.1	33.9
Tinplates and terne plates	75.1	24.9	75.5	24.5	71.3	28.7	71.3	28.7

In the products enumerated in the table the percentages of the corporation show increases in but two instances, namely, coke and wire nails. In 1902 the corporation produced 37.4 per cent of the total production of coke and in 1905 it produced 37.9 per cent, an increase of 0.5 per cent. In wire nails it produced 64.8 per cent in 1902 and in 1905 it produced 66.1 per cent, an increase of 1.3 per cent.

It will not be inferred from the figures we have presented that the United States Steel Corporation did not greatly increase its production of iron ore and of all forms of iron and steel from 1902 to 1905. On the contrary it has in these four years made great progress in enlarging and utilizing its productive capacity in nearly all the lines mentioned. But the progress made by independent companies in the same years has been productive of aggregate tonnage results a little larger than those achieved by the corporation.

The table completely disproves the statement so often made that the United States Steel Corporation is a monopoly which controls the iron ore, coke, and iron and steel industries of the country, and that it stifles all competition in these lines of industrial development.

Metal Market

ST. LOUIS.

September 4.

Despite the continued advance in lead ore, the metal itself is quieter and easier. Today it was quotable at $5.75, but none was taken. Spelter is firmer. The sale of one hundred tons was recorded at $5.92½.

A world's shortage of soft lead is announced as the cause of the continued advances in lead ore in which each of the companies having buyers in the Missouri-Kansas district is competing. As high as $82.50 a ton was paid during the week, with medium grades sold from $79 to $82.

Spanish soft lead is scarce this year, and European prices are high, upon which are based the high prices here, this state being the only other district producing so great a tonnage of a grade of such peculiar softness, known the world over as "Soft Missouri" lead.

The outward appearance of the zinc market was toward a decline in price, but there is a strong undercurrent apparent that may send prices upward before the end of another week.

Shipments are large and outputting conditions are the best of the year with a number of new mills starting the last two or three weeks. Compared with a year ago the shipment is larger by 1,136,440 pounds of zinc and 199,490 pounds of lead, the increase value being $50,946.

NEW YORK.

September 4.

Tin.—The market is easier owing to the report of unfavorable statistics. Figures compiled by C. Mayer, secretary of the New York Metal Exchange, show the total visible supply for Europe and the United States on August 31 to be 12,840 tons as compared with 12,572 for the same date is 1905, a difference of 268 tons. The following are today's quotations: Spot, 40¼ to 40½; September 39⅞ to 40⅛; October 39¾ to 40¼. London, £183 15s and £183 5s. Arrivals for the month of August, 3,198 tons.

Copper.—Heavy contracts for both lake and electrolytic have been made recently and the market is firm. Today's quotations: Lake, 18¾; electrolytic, 18½ to 18¾; casting, 18¼ to 18½. London, £86 and £85 17s 6d. Exports for the month to date, 14,855.

Lead.—The demand has increased and the market is firm. Today's closings, 5.85 to 5.90; St. Louis, 5.77½; London, £17 15s.

Spelter.—The market is quiet with a fair demand. Today's quotations: 6.00 to 6.10; St. Louis, 5.90. London, £27 5s.

Antimony. — Today's quotations: Cookson's, 23½ to 24½; Hallett's, 23 to 24c; other grades, 21½ to 22½.

Aluminum.—No. 1 ingots, 99 per cent pure, are offered at 36 cents, and No. 2, over 90 per cent pure, at 34 cents.

CHICAGO.

September 4.

Demand for metals is good, but prices are without noticeable change.

We quote lake copper 18⅞c to 19¼c, and casting copper 18¾c to 18⅞c for car lots, less than car lots, ¼c to ⅜c higher. Pig tin, 42½c for car lots; spelter, prompt delivery, 6.20c to 6.30c for car lots; lead, desilverized, 5.90c to 6.00c for 50-ton lots; corroding, 6.57½c to 6.67½c for 50-ton lots; on car lots, 2¼c per 100 lbs. higher; sheet zinc, $7.75 list, f. o. b. La Salle, in car lots of 60-lb. casks. Cookson's antimony, 27c to 28c; Hallett's, 26c to 27c.

Old metals are firm. We quote copper wire, 17c; heavy copper, 16½c; copper bottoms, 15¾c; copper clips, 16c; red brass, 15¾c; red brass borings, 14c; yellow brass, 12½c; yellow brass borings, 10½c; light brass, 9c; lead pipe, 5¾c; tea lead, 5¼c; zinc, 5¼c; pewter, No. 1, 24c.

Recent Developments in the Labor Field.

Judge Bethea, of the United States court at Chicago, has granted a sweeping injunction against the striking molders of the American Brake Shoe & Foundry Co. His finding was clear and explicit.

"Picketing at a general strike which produces intimidation is a violation of the law," said the judge in his decision. "A peaceful combination of a number of men to prevent this complainant from hiring men also would be a violation. One man can produce intimidation by the use of violence, and thus violate the law; a number of men may combine to do it peacefully, and that would still be a violation of the law, because by the combination a power is brought to life which would not exist if there were but one man. A peaceful strike is, of course, proper. Any man may quit his job and no one can compel him to work even though he violates a contract. Still any other man can take his job. That may be contrary to the ideas of organized labor and it may be a proper idea, but I am not discussing that part of the situation. Some think there should be another commandment. 'Thou shalt not take thy neighbor's job,' but that is not the law."

Some Boycott Decisions.

In a suit for damages brought by a baker of Racine, Wis., against the Trades Labor Council of that city, Circuit Judge Chester A. Fowler recently held illegal the contract exacted from the master bakers by the union in an effort to enforce the closed shop. The trades council and the individual members are enjoined from using "unfair list," the boycott is declared a conspiracy to accomplish a criminal and unlawful purpose, and the baker is allowed damages. The court declares the contract is "in itself an illegal contract in that it would by its terms obligate the plaintiff to employ union labor only as distinguished from non-union labor, and it would obligate him to maintain a closed as distinguished from an open shop." The decision in part is as follows:

The acts complained of are, in my view, plainly in violation of a statute that makes any two or more persons who shall combine, associate, mutually undertake or concert together for the purpose of willfully or maliciously injuring in his trade or business by any means whatsoever, or for the purpose of maliciously compelling another to do or perform an act against his will, guilty of an offense punishable by fine and imprisonment.

Justice Stafford, of the supreme court of the District of Columbia, has also handed down a recent decision holding that the boycott is legal, dismissing the rule directed to the Central Labor Union to show cause why it should not be forbidden to longer boycott an open-shop bakery. The case will be appealed. The judge states:

"The plaintiff has a right to conduct his business in his own way, without coercion, without intimidation, exactly as he should conclude it is for his own interest to act. The defendants, jointly and severally, are entitled to the same privilege. They have a right to sell their labor to whom they will and to withhold from whom they will. They have a right to patronize whom they will and withhold their patronage from whom they will. It seems to the court they have a right to call upon their friends and sympathizers to withhold their patronage from one who refuses to employ them."

Victory at New Orleans.

The molders' strike in the New Orleans district is now reported as a thing of the past so far as foundrymen are concerned, and all shops in the Metal Trades Association of Louisiana are running full with non-union molders and coremakers and are turning out more work than ever before. The Killeen Foundry, the Schwartz Foundry Co., the J. D. Connell Foundry & Machine Co., the Shakespearre Foundry Co., the Whitney Iron Works Co., and the Standard Pulley Co., remain loyal to the association, though a few of the smaller foundries, none employing over three or four men, signed an agreement almost at the beginning of the strike. Many of the strikers have gone to Panama, their places being taken by molders from the north furnished by the Joy Detective Service, of Cleveland, O., which handled the strike for the association. New Orleans employers state that they have found from experience that northern molders turn out more work with less urging than did the old men and as a result long-time contracts have been made with many who have moved their families to the south.

The Youngstown District.

The apprentices employed in the foundries of Youngstown, where the wage scale has not been signed, were called out last Saturday night. They had been working up until that time.

The Republic Iron & Steel Co. signed the wage scale of the molders a few days ago. On Thursday of last week the Youngstown Foundry & Machine Co. signed up for its steel foundry in East Boardman. Thomas Parrock, general manager, stated that the steel foundry was not considered to be within the jurisdiction of the Manufacturers' association, being a steel shop. In the regular foundries, operated by members of the Manufacturers' association, no change has been noted except the calling out of the apprentices.

It is reported that the United Engineering Co., operating the Lloyd-Booth shop, will, in the event that the journeymen make unreasonable claims, close down the shop. The firm has five other large plants.

T. R. Akin, general superintendent of the Republic Iron & Steel Co. mills, was in the city Friday and Saturday of last week, coming for a conference with B. F. Jones, vice president of the finishers' division of the Amalgamated Association, in reference to the number of helpers paid by the company as assigned to work at the bar mill furnaces of the Valley mill. The question of the roughers assisting the rollers on the 18-inch mill at the Valley plant and on the No. 3 bar mill at the Brown-Bonnell works was decided amicably among the men employed as roll hands.

Labor Notes.

The works of the Grey Iron Co., Mt. Joy, Lancaster county, Pa., suspended operations Friday because of difficulty with molders.

The strike at the works of the Lebanon Valley Iron Co., Lebanon, Pa., has been given up by the men who have published an advertisement to the effect that the strike is off.

The administrative council of the National Metal Trades Association will hold a meeting in Cincinnati early in October.

The postal authorities have ruled in favor of the open shop by holding that so long as postal clerks or other post-office employes conform to the rules and regulations of the office and do not attempt to coerce or in any way molest those who do not enter the union there will be no objection to employes affiliating with labor organizations. Those who, for reasons of their own, do not see fit to join the union will be accorded the fullest protection.

Employes of the steel department of the Wheeling Steel & Iron Co., Wheeling, W. Va., have asked for an increase in wages.

The molders employed at the Terre Haute plant of the American Car & Mfg. Co., have returned to work after a week's idleness.

It is reported by the National Metal Trades Association that since July 1, 1900, labor difficulties had arisen in 162 foundries employing over 5,200 union men. In all but two cases the affected plants are now operated as independent shops.

SHIPMENTS DECLINE.

August Record From Head of Lake Ports Shows a Falling Off.

Office of THE IRON TRADE REVIEW. }
Duluth, September 3. }

During the past week, in fact for some time past, the Allouez docks have been short of boats and the dock has been uncomfortably crowded with ore. At the Missabe docks delays have resulted from shortages of boats for some days and then when the fleet does come the dock slips become congested and the right ores seem to be lacking. These are not unique conditions, but are particularly troublesome at times as they have been the past week or so, when delays aggregating at least 48 hours were also experienced from weather conditions. The transfer yard laid out at Proctor during this summer is aiding the Missabe dock materially. The various groups are now separated out of a train in the yard which avoids the transferring formerly necessary on the dock. The record of three docks for the past month is as follows:

	Two Harbors.	Duluth.	Superior.	Total.
Aug. 21-31, '06	431,486	563,211	191,097	1,185,794
Aug. 21-31, '05	426,037	498,720	233,611	1,158,368
Increase	5,499	64,491	*42,514	112,454
Aug., 1906	1,256,883	1,585,922	906,960	3,749,765
Aug., 1905	1,251,365	1,419,221	700,988	3,371,574
Increase	5,518	166,701	205,972	378,191
July, 1906	1,288,625	1,783,086	917,761	3,989,472
Decrease	31,742	197,164	10,801	239,707
Total to Sept. 1, 1906	5,122,036	6,518,430	3,578,496	15,218,962
Total to Sept. 1, 1905	5,018,358	5,533,597	3,220,979	13,772,934
Increase	103,678	984,833	357,517	1,446,028

*Decrease.

Several noteworthy facts are brought out in the above table, principally that the shipments from each of the three docks were less in August than in July, and that the total falling off amounted to 239,707 tons. It also appears that Allouez docks handled less in the past ten days than in any other seven days during the month. However, the shipments during the first three weeks of the month last year were so small that the total last year was less than this year's total by over 200,000 tons. It is easy to see where the great activity is when it is noted that of the 1,446,028 tons increase this year, nearly a million of that has been gained at the Missabe docks. With one-half of the No. 4 dock working, the attempt will be made to ship 2,000,000 tons at Duluth during September.

Mine operators having ore to sell are being besieged by the buying contingency at the furnace end to hasten delivery on this year's contracts, to supply deficiencies in this year's supply not provided for and to quote prices on next year's delivery so that requirements can be covered at once. And well may consumers of ore be anxious, for production will not come up to expectation and the consequent shortage will fall entirely upon the independents. Present requirements for this year's delivery of Bessemer ore can only be met by paying a premium of at least 50 cents a ton, if at all. One large company, in the market within the last two weeks for Mesabi Bessemer, paid $4.25 per ton for one lot of 25,000 tons and a little later $4.35 a ton for a similar amount. Another interest bought 10,000 tons of the same ore which ran only 52 per cent natural, instead of 56.70 per cent at $4.30 a ton, the usual price of the 56.70 per cent Mesabi Bessemer being $4.00 at Lake Erie ports. It is confidently predicted that the price of Mesabi non-Bessemer ores will be 25 to 30 cents higher next year and that Bessemer ores will be advanced 50 cents or more, especially old range Bessemer. The present prices, $4.25 for old range Bessemer, $4.00 for Mesabi Bessemer and $3.50 for non-Bessemer, do not represent the price that the present stringency in supply and the eager demand would naturally create and while ore interests do not wish to and have not taken advantage of their position, they believe that the advances quoted are easily justified at present, to say nothing of next year. The refusal to quote on next year's delivery arises from the natural position of the seller, for, they feel that with the fulfilment of this year's contracts still uncertain and with the price of pig iron going steadily upward, to quote now would be premature. The desire is to postpone the filling of requirements until the first of the year, but the insistence of the buyers may force an earlier closing of contracts. Practically all of the supply of old range Bessemer is controlled by the United States Steel Corporation, Jones & Laughlin, and Cambria Steel Co., and it is difficult to predict just what those who must buy independently will have to pay for it if they are caught short during next season.

SOUTHERN STEEL CO.

Increases Capital to Take Over Iron Companies.—Southern Developments.

Two important meetings affecting industrial companies in Alabama were held during the past week and both meetings will mean considerable for this section of the country.

Stockholders of the Southern Steel Co. met at Gadsden and decided to increase its capital stock from $16,000,000 to $25,000,000. While no definite statement is made, it is understood that the company will acquire the properties of the Lacey-Buck Iron Co. and the Chattanooga Iron Co. Each of these operates a furnace and ore and coal mines, limestone quarries and other properties. By the addition of the two furnaces and the other properties the Southern Steel Co. becomes a very formidable concern in industrial circles. It is announced that $5,000,000 of the additional stock will be preferred and the $4,000,000 remaining common.

The other meeting was that of the Bessemer Coal, Land & Improvement Co. at Bessemer, Ala. The capital stock of this company was increased $250,000. It owns and operates coal mines in Bibb county, Ala., and at Wind Rock, Tenn., and it is understood that the greater portion of the additional stock will be used in making further development in the coal fields.

John A. Topping, president of the Republic Iron & Steel Co. and chairman of the board of directors of the Tennessee Coal, Iron & Railroad Co., is in the Birmingham district looking over conditions in this section and watching the progress being made on the new steel plant at Ensley. It is believed that during his stay here Mr. Topping will start some other plans agreed upon some time ago looking to further development and improvement of the immense properties of the company. The announcement was made several months ago that the Republic company planned the expenditure in this district of several million dollars. That there was truth in the assertion has already been demonstrated by the purchase of the Birmingham Southern railroad, the construction of a new steel plant and in other ways.

The leases and rights of the York County Iron Co., which has a number of banks in York county, Pa., it is understood, will be offered for sale this month.

PERSONALS.

Judge E. H. Gary is expected to return from Europe about Sept. 15.

George Westinghouse has returned from an extended European tour.

C. B. Mitchell, president of the Chattanooga Plow Co., who has been touring Scotland for some time, is expected to return about Oct. 1.

Harwood Wilson, one of the resident manager of Rogers, Brown & Co., at Cleveland, is spending the month at Trenton, Tenn., his old home.

Samuel McDonald, who built the Bessemer plant of the Republic Iron & Steel Co., was recently called from California by the death of a brother at Bellaire, O.

E. H. Hargrave, of the Cincinnati Tool Co., is arranging a sea trip from some Atlantic port to San Francisco, visiting the principal South American countries en route.

The announcement is made by Jones, Caesar, Dickinson, Wilmot & Co., certified public accountants, and Price, Waterhouse & Co., chartered accountants, of the admission to partnership of George R. Webster, C. A.; C. P. A. (Ill.), and W. Ernest Seatree, A. C. A.; C. P. A. (Ill.). The firm names will remain unchanged.

W. P. Westenberg, who has succeeded J. G. Coleman as secretary of the Wisconsin Malleable Iron Works, Milwaukee, has been identified with that company for twenty years or more, the greater part of that time as superintendent. He is well known in business circles, having an interest in one of the large dry goods houses of that city, in addition to his interests in the iron business.

E. B. Clark, formerly assistant general superintendent of the South works of the Illinois Steel Co., has resigned to become vice president and general manager of the American Sintering Co., Railway Exchange building, Chicago. He is succeeded by P. A. Newton, formerly assistant general superintendent of the Joliet Works. J. I. Larimer, superintendent of blast furnaces at Joliet, has succeeded Mr. Newton, and M. McClung, formerly assistant superintendent of furnaces at South Chicago has been made superintendent of blast furnaces at Joliet.

W. H. Whiteside, president of the Allis-Chalmers Co., Milwaukee, has returned from a two months' combined business and pleasure tour of England, France, Germany and Switzerland. He found more skilled workmen idle in England than elsewhere and believes the number to be greater than in any other country. "This," he says, "is easily accounted for. The country is limited in extent and its great industries are along certain lines, such as ship building. The manufacturer is not protected, and the markets are open to foreign trade, with Germany and the United States as the strongest competitors."

OBITUARY.

Henry A. Hitner, senior member of the firm of Henry A. Hitner's Sons, Philadelphia, is dead at the age of 45. He was the successor of his father in the scrap business.

Paul Dickinson, head of the iron and locomotive works operated in his name with headquarters at Chicago, died Aug. 31, at the age of 39. He was born in Milwaukee, removing to Chicago at an early age.

Charles H. Miller, chief purchasing agent of the Midland Steel Co., died Aug. 26, in the city hospital, at Youngstown, O. He was called to that city the previous day on a business engagement and was taken suddenly ill, death following almost immediately. He was married but three months ago.

E. T. Hannam, inventor of the Atlas water-tube boiler, died at Chicago, Aug. 18. Death was due to heart disease, the end coming just as he was entering a train in company with J. P. Johnson on the way to the latter's home at Evanston. He had been connected with the Atlas Co. for many years, having been located at the Philadelphia office from which he had just been promoted to assistant manager of the water-tube boiler department.

Thomas W. Watt, a pioneer in the Connellsville coke industry, died Aug. 26, at Dunbar, Fayette county, Pa. He was born in Ireland in 1828, coming to America about the middle of the century and locating near Dunbar where Union furnace, one of the oldest west of the Allegheny, was operated by his father as John Watt & Co. Later when the plant was sold he became general superintendent and then went into the coke manufacturing business. He assisted in building a railroad line from Connellsville to Uniontown, and shortly after organized the Taylor-Watt Coal & Coke Co., known as the Uniondale Coke Works. In 1872 he helped organize another company known as the Hogsett-Watt Coal & Coke Co., at Mt. Braddock, Pa., which finally became the property of the W. J. Rainey Coke Co.

INCREASED BOUNTIES

Paid By Canadian Government Indicate Increased Iron and Steel Output.

(Special Correspondence.)

Toronto, Can., Sept. 1.—An official statement of the industrial bounties paid by the Canadian government during the fiscal year ended June 30, 1906, indicates a considerable increase in the output of the iron and steel industry. Although the bounty per ton has been considerably reduced by the operation of a sliding scale, the total payments are larger. The aggregate payments to all subsidized industries amounted to $3,088,407, as against $2,859,351 for the year 1904-5. The total iron and steel bounties paid were $2,004,339, as against $1,540,203 for the previous year.

Bounties on pig iron were paid at the rate of $1.65 per ton on the product of Canadian ore, and $1.10 on that of foreign ore. This amounted to $687,631, representing an output of 581,858 tons of pig iron, of which 86,532 tons was made from Canadian ore, as against a total output of 386,719 tons, of which 59,452 tons was from Canadian ore in 1904-5. The recipients were: Canada Iron Furnace Co., of Midland, Ont., $40,256; Deseronto Iron Co., $13,664; Hamilton Steel & Iron Co., $98,882; Dominion Iron & Steel Co., $246,353; Nova Scotia Steel Co., $65,075; Londonderry Iron & Mining Co., $51,525 and Algoma Steel Co., $167,420.

On steel ingots, the rate on which was $1.65 per ton, the payments were $941,000, the output being 569,237 tons, as against 279,916 in 1904-5. The participating companies were: Hamilton Steel & Iron Co., $67,578; Nova Scotia Steel Co., $96,803; Dominion Iron & Steel Co., $408,571 and Algoma Steel Co., $367,770.

On articles manufactured from steel, such as rolled angles, wire rods, plates, etc., the bounties amounted to $369,832, the output being 72,875 tons, against 59,842 tons for the previous year. The companies participating were: Dominion Iron & Steel Co., $302,413; Nova Scotia Steel Co., $25,815; Montreal Rolling Mills, $7,386 and Hamilton Steel & Iron Co., $34,217.

Edward Gurney, president of the Gurney Foundry Co., Toronto, was in Winnipeg last week, where the company has arranged for the erection of a warehouse at a cost of $50,000.

Theodore Tonnele, of the Tonnele Engineering & Construction Co., Pittsburg, was in Toronto this week.

The New Plant of the Steel Foundry Co., Cincinnati, Ohio.

Cincinnati is one of the largest machine tool centers in America, and in connection with the machine tool industry a large gray iron foundry industry has been developed. Many of the Cincinnati foundries have long been noted for the excellent quality of the work turned out, but local manufacturers have always had to depend on outside parties for steel castings. Lately the inconvenience arising from the difficulty in getting prompt deliveries has been so great that some of the local manufacturers decided to see what could be done to relieve present conditions. As a consequence the Steel Foundry Co. was incorporated, the owners being local manufacturers and business men.

A site 500 x 1,000 feet was secured on Winton Place, which is very near Ivorydale, the site of the noted soap industry conducted by Proctor & Gamble. This site has good railroad facilities for shipping purposes and for the delivery of raw material. Cincinnati also possesses certain marked advantages as a steel foundry center, as it is situated midway between the northern and southern iron fields and hence can secure any grade of iron at very reasonable terms. There is also a very large amount of local scrap which can be worked up by the open-hearth process. These conditions certainly made the business venture an exceedingly attractive one, since the market already existed, with unusually favorable conditions for supplying the demand.

The construction work on the plant was started early in the spring of the present year, and it now consists of two buildings, one a two-story brick building, 30 x 90 feet, containing on the first floor the office, chemical laboratory, store room and power house, and on the second floor the drafting room, testing laboratory and pattern shop. About 50 feet from the office building is the foundry proper. This is of steel construction covered with corrugated iron. The foundry building is 135 x 240 feet and is divided into three bays. The central bay is served by two Pawling & Harnischfeger traveling cranes, of 5 and 15 tons capacity, respectively, and 65-foot span. The west bay contains the furnaces, sand bins, core department and flask shop, while the east bay contains the annealing oven, cleaning department, machine shop, mold drying oven and the light work floor. The plant is equipped with an industrial railway system throughout.

To begin with the raw material and follow the steel castings through their various processes will probably be the most intelligent method of treating the plant. At the north end of the works there is a large yard for the storage of pig iron, scrap, etc. The material for the furnaces is taken into the building by an incline, the cars on which are drawn up by an electric hoist. Between the furnaces and the end of the building are situated a series of bins for iron ore, furnace lining material, etc.

The furnace equipment consists of one 15-ton acid open-hearth furnace and one 20-ton basic open-hearth furnace. Both furnaces are of the stationary hearth type, and the checker work is situated beneath the furnace. Crude oil is used for fuel, the air only being passed through the checker work. The furnaces are charged by hand and the metal is tapped into ladles in the main bay of the foundry. At present a large number of wooden flasks are used for the special lines of work which are being manufactured, but in the future they will all be replaced by metal flasks.

The molding sand is kept in a large bin at one end of the furnace, the capacity of which is 200 tons, the bin being filled from cars on the outside of the building. The sand is prepared by grinding in the usual manner. The core department is situated next the sand bin, and is of sufficient area to take care of

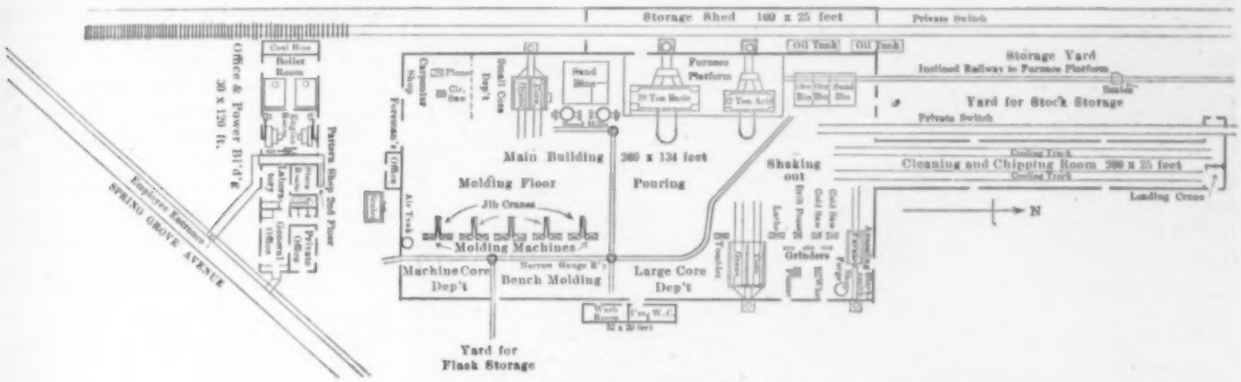


FIG. 1.—PLAN OF THE STEEL FOUNDRY CO.'S NEW PLANT AT CINCINNATI.

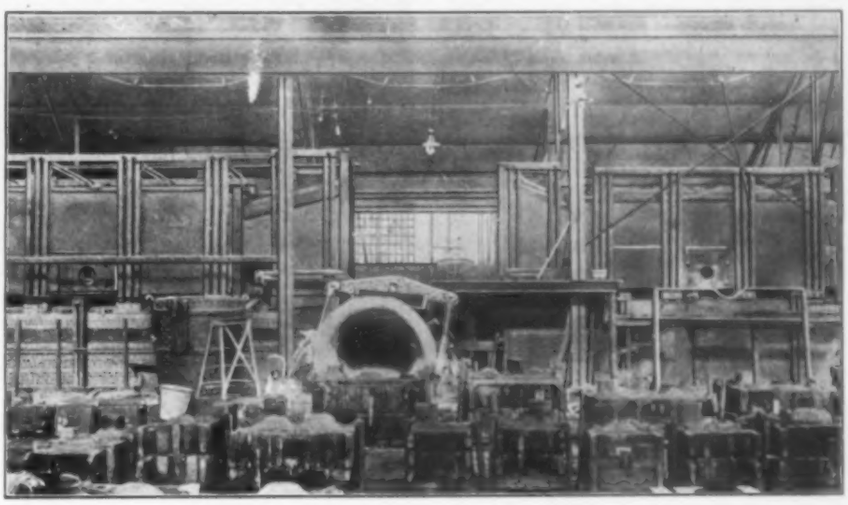


FIG. 2.—OPEN-HEARTH FURNACES.

the entire capacity of the plant. The core ovens consist of two large brick ovens, 8 x 8 x 16 feet, at the back of which are arranged two Hill & Griffith ovens with swinging shelves.

In the southwest corner of the building, next to the core department, is located the flask shop. This is equipped with all of the wood and metal working machinery necessary for the construction of both wood and metal flasks.

FIG. 3.—TWO OF THE MOLDING MACHINES AND A JIB CRANE.

All of the special molding and the larger work is done upon the floor in the usual manner. The duplicate work, which consists largely of car truck frames, is made upon molding machines, which are arranged along the east side of the central bay of the foundry. There are ten of these machines arranged in pairs, one machine forming the cope and the other the drag of the mold. Each pair of machines is served by a jib crane, with a 3-ton pneumatic hoist. These cranes were furnished by the Whiting Foundry Equipment Co., of Harvey, Ill. The cranes serve to place the flasks upon machines, remove the cope and drag portions of the mold, and assemble the same.

The most of the work made is molded in green sand and skin dried, and for the special duplicate work two large mold ovens, 9 x 9 x 21 feet, have been provided.

For finishing or cleaning the castings pneumatic chipping hammers or other pneumatic tools are used quite extensively. The plant is also equipped with cutting-off saws, lathes and drill presses.

The truck frames and some other classes of castings require annealing. This is accomplished by an annealing oven located in the northeast corner of the plant. The oven is 8 x 8 x 16 feet and is heated with crude oil. After the castings are removed from the annealing oven they are placed on a series of hot beds made up of railroad rails. The work can be slid out through the north end of the plant and left to cool upon these hot beds, which also serve as chipping stands.

The power equipment consists of two Geary water-tube boilers, a 200-horsepower engine which is connected to a 125-kilowatt generator, furnishing current at 220 volts.

For supplying the compressed air needed about the plant, a duplex 2-stage compound air compressor manufactured by the Laidlaw-Dunn-Gordon Co., is used. This compressor has a capacity of 1,000 cubic feet per minute, at 100 pounds pressure.

The heart of any steel foundry is, to a large extent, the laboratory, and this plant is provided with a remarkably well equipped laboratory. All of the necessary apparatus has been installed and carefully arranged so that the work can be done rapidly and accurately. In addition to the chemical laboratory there is a testing laboratory for conducting physical tests. All of the raw materials, as well as finished product are analyzed and looked after by the chemist.

FIG. 4.—CORE DEPARTMENT.

Mining for Rails.—Newspaper dispatches from Liberty, Tex., report the discovery of a "deposit" of about 10,000 tons of rails near that city and a distinct "mining" innovation incident to their recovery. Forty-six years ago a syndicate of wealthy planters planned a railroad up the valley of the Trinity river and purchased the rails for the project in England, shipping them by water to a point just below Liberty where they were unloaded on the river bank. Then the war came on, the promoters of the road were killed and the rails were forgotton after a heavy flood had covered them with a thick deposit of sand. Recently a negro who helped unload the barges interested T. E. Nichols, of Houston, Tex., in locating their whereabouts and they were located under 36 feet of sand and some distance from the present course of the stream. The town agreed to a royalty offered by Mr. Nichols and the rails are now being taken out of the sand pit and are bringing a good price. They have suffered little by reason of their long burial.

MATERIAL: RECEIVING AND RECORDING.[1]

BY F. E WEBNER.[2]

In practically all shops the broad rule obtains (1) to weigh, count or measure incoming goods to the end that it may become patent that all goods eventually paid for shall have been received, then (2) to place such goods in the storage compartments where they severally belong and (3) make a record thereof; all of which seems very simple and ought not to be otherwise than simple, yet in twenty-five shops perhaps twenty entirely different general plans may obtain in the respective shops; the efficiency thereof meriting judgment promiscuously as good, bad and indifferent as the individual case may be.

Not a great deal can be said of the physical operations involved in receiving the goods as conditions vary so greatly as to make specific rules inapplicable. One shop may be so situated geographically that local delivery wagons may appear at every hour during the day; another shop may collect all "L. C. L." freight and packages with its own wagons at certain intervals each day, yet another shop may be far removed from the busy marts of trade and be accessible only by rail shipments, but whatever the means of conveyance or transportation it is a foregone conclusion that to insure accuracy the goods received must at some time and place be counted, weighed or measured. In the last article was mentioned a certain copy of the purchase order which was to be for the receiving clerk, and which, when made with short carbon, was to show commodities and not quantities. That plan is solely for the purpose of requiring accuracy in the count, and is a simple means of safeguard. It is a well known fact that, as a rule, greater care is taken on a count where the desired result is a totally unknown quantity. Take as an example, a gross of small boxes or units of any kind and in the counting thereof the receiving clerk has taken up two at a time, or four at a time except possibly in three or four instances toward the last when he wanted to speed up and took up three or five or something different than he started on and ended by being one short or one over; in nine cases out of ten he will puzzle over his calculations a moment or two and draw the conclusion that he counted wrong, and check the gross as being all there when possibly it is there and possibly it is not. When goods are received along about quitting time and the receiver wants to insure his prompt departure from the works there are many temptations that arise to make the receiver take chances on the seller's accuracy at the expense of "the company;" if the selling concern bears a fairly good reputation for accuracy many invoices are "guessed" to be correct without positive verification. The surest plan is to have the receiving clerk know about what commodities are expected that he may be on the lookout for them and make due preparation, if necessary, for their reception, but to require him or his department to actually handle the stuff and in his copy of the purchase order to insert the quanties which he actually received, that the count may be sent to the office for verification with the invoice by disinterested persons. A good plan is to occasionally intercept packages and have one or more units removed before reaching the receiver so as to keep him constantly on the *qui vive*.

FIG. 5.—LABORATORY.

FIG. 6.—FLASK SHOP.

Car Load Freights.

Where the works are equipped with track scales it is a good practice to catch weights on all classes of car load freight together with the tare or light weight on the empties. This is probably done in cases of bulk goods like coal, but it is not always practiced on commodities where specific weights are taken or different sizes, grades, shapes, etc.; yet it should be, as it is an additional check on the accuracy of the specific weights

[1]Third of a series of twelve papers on "Cost Keeping."
[2]Certified public accountant, Cincinnati.

on the hypothesis that the sum of the parts must equal the whole. Again oftentimes the weights disclose freight overcharges, on which claims can be made.

Where car loads are received to a considerable extent a car book is very essential and can be so divided as to cover a wide latitude, and while the keeping of this record may not devolve upon the receiving clerk, yet its description fits it nicely under this division of the subject. The purposes that such a book will serve are legion: the columns across the folio of a book (either bound or loose leaf) to be somewhat as follows:

Date received.
Initial.
Car number.
Transferred from.
From whom.
Commodity.
Loaded weight.
Empty weight.
Net weight.
Marked tare.
Shipper's invoice, date and No.
Delivery (f. o. b. point of shipment or destination).
Transportation.
Freight bill.
  Pro-number.
  Amount.
  Date paid.
  Charged to (shipper or to freight account).
Switching bill.
  Pro-number.
  Amount.
  Date paid.
  Charged to (shipper, freight or switching).

In the case of coal, coke, castings and other commodities bought by bulk weight, special "net weight" columns can be added, if desired, to show synthetical information in the individual cases, thereby proving the accuracy of cost department and stock room figures by requiring the sum of individual groups to equal the whole amount received.

Indexing Car Numbers.

In cases where the handling of cars is a large proposition, it will expedite the work to institute a plan of indexing car numbers to a form of ledger, using for the various ledger headings the names of railroads whose cars are received. This plan does not contemplate involving any certain railroad company in any possible way, but the idea is used purely and simply to be enabled to have a classification of from twenty-five to fifty names under which to distribute car numbers in such a manner as to have them quickly located when wanted.

It is possible that this plan may appear to the reader to partake something of the nature of that job which is sometimes very soberly given to the new clerk to accomplish, to wit; balancing the car numbers for the day. It is not like it, however.

The car ledger should be a specially prepared book having page headings for the railroad initials and columns thereunder for "date," "commodity," "shipper," "via," "transferred from," "transferred to," and any other headings which may occur to the user, but, as this is to be used largely for identification, not much else will be needed, as other information will probably be kept elsewhere.

For the index the proper thing is a book having printed on each page figures from "1" to "1,000" with blank columns after each column of figures, the blank space being for the insertion of car initials or a figure (perhaps the ledger folio) arbitrarily given to represent such initials. The index page number constitutes the thousands, as for instance if No. 47,962 were wanted it would be found on index page "47" and, opposite the printed No. 962, on the page would appear the initial of the car and in fact the initial of all the cars of that particular number that ever were received since the starting of the book. If the number happens to be a frequently used one, it is a good plan to date each initial as it is inserted. However, if the reader will stop to consider, the chances seem very small of the same car coming back again repeatedly. The same number with different initials will happen more frequently and oftentimes a coincidence will occur and will possibly be very confusing unless handled with an index.

Temporary Disposition.

Under the classification of material received very naturally comes the means of temporary disposition for such material. Any and every shop, no matter how small, if not already so equipped, should by all means institute a series of designating numbers and letters for the various buildings, departments, sections, etc., etc., and new shops will do well to start such a series from the inception of the business, rather than postpone it and finally have to come to it. If the installation of a cost system is undertaken, it becomes almost imperative to have such designations, as the location shown in stock ledger sheets will be cumbersome if shown anything like this: "In material shed east of blacksmith shop, located near third pillar on right hand side, fourth shelf from bottom."

In assigning designations the simplest plan is to designate building by number, divisions therein by capital letters, sections of divisions by numbers, and drawers, shelves, or compartments therein by single or double small letters so that without confusion of figures the entire designation may be tersely stated, as for instance "5 D 19h." Where a stock ledger is kept for a particular store room, the 19h may be sufficient, yet the full location is preferable as a positive identification, especially if a card system is used.

In buildings where there are no pronounced structural lines of demarkation, as for instance an open building used for storing piles of lumber, pipe, angle iron, round iron, shafting, etc., etc., too cumbersome or too plentiful for racks, the room can be, and in old established shops is found to be already laid off in rows of material with aisles preserved for passage of trucks, etc. If there are two aisles running the length of the building (as is the case in storage buildings of a number of different concerns which the writer has in mind) and each aisle has two rows of material that can be handled from it, making four rows all told, then the various rows can be lettered A, B C and D respectively, or, if there is but one row between the two aisles and one on each side, then A, B and C will suffice; however, whether there be two rows or five, the proper designation can be given and ought immediately to be properly published by labels or signs made in large and conspicuous letters; such signs can be attached to posts at frequent intervals or may be suspended by wires from the roof. The figures representing sections can be carved in the floor or put down with metal figures or can be punched out on a stencil cutting machine and tacked on the floor far enough back so as to clear the truck wheels. Where there are racks, there is usually a place where painted signs can be put advantageously.

In open spaces in yards where material or second hand goods are stored as much care ought to be exercised as in a building. Sign posts can be prepared and avenues laid off and the goods systematically disposed of so that the space does not have the appearance of a junk shop; if it be in reality akin to a junk shop, the goods will present a much better and more saleable appearance when neatly

arranged so as to present the best effect to prospective buyers.

Incidentally a plan of divisions and sections is an excellent time and patience saver in the storing of foundry flasks. They can be made readily accessible when wanted instead of having to pull over great piles of promiscuously intermingled flasks in an anxious search for the desired size.

Eternal Vigilance Required.

That when certain goods are paid for but never received the cost of production is increased beyond what it ought to be is a foregone conclusion. Now it makes no difference how the goods happened to be short, the effect will be the same, and it requires eternal vigilance to insure the safeguarding of all material that has been, or will be paid for. In plants where but one line of goods is produced and the cost accounts are limited and consist mainly of "material," "labor" and "manufacturing expense" with perhaps a few divisions of each, then any costs which might occur for material not received would be a direct charge to material account and beyond a doubt would never be discovered. In plants where specific costs are found and a going inventory is maintained and by some manner of means the unreceived goods get put through the stock ledger as they would be, if they passed detection at all, then they will not show against any specific shop order, but the cost will be there nevertheless, for the reason that when inventory is made of the certain class of goods of which the unreceived goods were a part (in name only) then the shortage will be uncovered and the clerks may never be able to check up just where the difference occurred, yet the additional cost is there and must be spread over product, which can be most satisfactorily accomplished by including it in with the diffused expense which is to be explained in a later article.

The barometer of inaccuracy or dishonesty will be an account to be called "Variation of weights and measures" to which will be charged all differences as they are found; credits to this account to be absorbed in manufacturing expense each month as time proceeds after a manner to be described in another article. If such differences are to run too high in volume, there will be a need of a readjustment of the clerical machinery.

A Difficult Proposition.

The recording of purchase invoices presents a more or less difficult proposition where a cost system is to be installed in a going business unless, perchance a consistent plan is already in use or the management is willing to depart from time worn precedents, and change to not necessarily a more modern way but to a plan that dovetails better with the general plan of cost accounting.

In a scientific cost system the king pin of the whole plan is a "general exhibit" which is double entry rounded out and perfected; the general exhibit is the one book in the entire set which is in equilibrium, the other records being subsidiary to it, and each subsiding book or record must articulate with its synthetical or controlling accounting the general exhibit. It is the better way by far to have the cost system a compound part of the general records of the concern and when that is done, then the "general exhibit" presents in a way a going balance sheet of the concern's affairs. If that is not done, then the exhibit which controls the cost records, becomes merely a "factory exhibit."

Assets	Date	
	Descriptive	
	Entry from Cash	Debit / Credit
	Bank	Debit / Credit
	Accounts Receivable	Debit / Credit
	Goods in process	
	Department A	
	Material	Debit / Credit
	Labor	Debit / Credit
	Diffused Exp.	Debit / Credit
	Department B	
	Material	Debit / Credit
	Labor	Debit / Credit
	Diffused Exp.	Debit / Credit
	Department C	
	Material	Debit / Credit
	Labor	Debit / Credit
	Diffused Exp.	Debit / Credit
	Accruing Manufacturing Costs	Dr. / Cr.
	Raw Material	Dr. / Cr.
	Semi-finished product	Dr. / Cr.
	Finished product	Dr. / Cr.
	Purchased merchandise	Dr. / Cr.
	Other Assets (On private ledger)	Debits / Folio / Credits
Liabilities		
	Accruing Pay Roll	Debit / Credit
	Accounts payable	Dr. / Cr.
	Other Liabilities (on private ledger)	Debits / Folio / Credits
Loss and Gain Accounts		
	Commercial Costs	Debit
	Production Costs	Debit
	Sales of product	Credit
	Sales of semi-finished product	Credit
	Sales of By-Product	Credit
	Sales of Raw Material	Credit
	Discounting Purchases	Credit
	Other Revenues	Credit

On the hypothesis that a general exhibit is to be used, the descriptions to follow will have a broader scope. If a factory exhibit only is desired, it makes really a more cumbersome plan in as much as there will be necessary such a multitude of transferring entries which make practically double clerical labor on the controlling books, and on the whole is not as satisfactory to anyone concerned.

A general exhibit should in the main have columns across the folio in the foregoing table.

The foregoing list of columns makes it appear to require a large book and so it will be a large book if ruled in such manner as to be laid out flat when opened, but the book builders of modern times have made it possible (after the unceasing urging and coaxing of "theorists") to use flyleaves or short leaves with the master leaf, reinforced in such manner as to present the same appearance as a solidly bound book and yet confine the size to small dimensions. While the exhibit book may be one frequently used it will not require frequent entries, as only the totals of the subsidiary records are shown in it, that and possibly an occasional adjusting entry.

The plan of the exhibit permits the use thereof for all original entries. If desired, however, it is much more satisfactory to relieve it of all the friction such a use would entail by individualizing with subsidiary records, and showing the totals only in the exhibit as described. The exhibit, while it contains not only "material" totals, but "labor" and "expense" as well, is described under this article merely for the reason that this material article precedes the others and it is deemed advisable to describe the exhibit early in the series.

The primary entries of invoices should be made to a purchase analysis with columns for date; from whom purchased; descriptive; accounts payable Cr.; (this column being for the net amount of the invoice, the total of the column going to the credit of accounts payable on the exhibit), then following as many Dr. columns as desired in conformity, however, with the columns mentioned for the exhibit, such as the various columns under goods in progess, also raw material, purchased merchandise and accruing manufacturing costs. If it is decided to issue all material on store room requisition only, then all raw material received will be charged directly to the raw material account and the goods in process group will not be necessary.

Where it is desired to maintain ledger accounts with creditors the posting can be done directly from the

purchase analysis to the ledger and in as much as the various entries find their way to the ledger and the total thereof is carried to the exhibit, it is plain to be seen how a synthetical or controlling account is preserved.

Where a voucher system is used, the plan does not vary greatly from the purchase analysis save only in that the record is called a voucher register or voucher distribution and the entries are not posted to a ledger account.

A MODIFICATION OF THE METHOD FOR THE DETERMINATION OF MANGANESE IN IRON.

Reginald Meeks, in an article on the above subject in the *Engineering and Mining Journal,* writes as follows:

In the Ford-Williams method for determining manganese, filtering is done on an asbestos plug and this is later returned to the original beaker for titration with potassium permanganate. When pig or cast iron is dissolved, the graphite, which stays throughout the determination, soon contaminates the asbestos and the end point must be determined against a gray background. This requires considerably more skill and experience than if the asbestos were pure white. In order to obviate this difficulty the following modification is offered which, I believe, has never been previously described.

Two grams of borings, separated by magnet, are weighed into a No. 3 Griffin beaker. Dissolve in 25 c.c. hydrochloric acid (1.2 sp. gr.) and evaporate to dryness. Take up with 20 c.c. nitric acid (1.20 sp. gr.) and boil. Filter on a small cotton plug (filtering is extremely rapid) and wash with as little water as possible to effect a clean separation from silica and graphite. Boil down to about 10 c.c. and add 20 c.c. concentrated nitric acid, and boil till no red fumes come off. Add five grams potassium chlorate and boil five minutes. Filter on asbestos.

The asbestos plugs should be of generous proportions and packed tightly into three-inch funnels connected to the suction by means of suction flasks. Throw about 20 c.c. concentrated nitric acid on the filter and follow with the precipitated manganese dioxide. Five washings of water will usually free the filter from acid, after which the plug is transferred to the original beaker, ferrous sulphate is added and titration is performed in the usual manner. By this method the asbestos is kept pure white and may be used almost indefinitely.

AMERICAN MACHINERY

Proves Unsatisfactory in Egypt.—Causes of Failure.

Lewis Morris Iddings, United States consul general at Cairo, in a description of the commerce of Egypt, says:

"It is in iron and steel manufactures, machinery, and kindred industries, especially for every description of agricultural machinery and implements, that Egypt offers the widest field for expansion, yet it is precisely in these articles that imports from the United States are most rapidly running down. The American manufacturer apparently will not build machines adapted to the soil and climatic conditions of Egypt and the Sudan; he will not believe that his deep-plowing machines ruin the land by turning up the salty soil below, nor that machines which will do the work claimed for them in America can possibly break down and fail to work at all in Egypt. He will not put in a bit of extra metal here and there to strengthen parts and give his machine some chance under adverse conditions; he will not 'finish' or protect those parts of a machine which the fine sand of the desert can enter so easily and constantly; he will not, as implored, cast his gearings in steel instead of iron of such dubious quality that it has been characterized as 'slag;' he will not do much of anything that he is asked to do, but will simply dispatch the goods for which he has been paid in advance just how and when it suits him.

"It is significant that nearly everyone who has set up in business in Egypt intending to deal exclusively in American goods—machinery or what not—has found it advisable to speedily change his policy. Here is a case in point: A merchant, having wide connections with Egyptian landowners and finding that others were abandoning a certain line of business, purchased, for cash, American stock to the value of $200,000. He also paid the expenses of the maker's engineers to come to Egypt, set up the machinery, and superintend the first workings. The cast iron gearings broke. Then the spare parts were fitted and also broke. The engineers declared that cast-iron gearings could not stand the strain. Gearings in cast steel were telegraphed for, but cast-iron parts were sent instead, and these likewise broke. In desperation the broken parts were shown to a local founder, who readily cast them in steel, which stood the strain, cost 50 per cent less than the parts brought from America, and the parts were delivered within one week.

"Of the $200,000 order sent by this merchant to America, stock to the value of $60,000 still remains on hand, and he is now buying his goods in England and Germany. The English and the Germans, he says, treat him decently. Other people who claim experience declare that American machinery in general is light, flimsy, unfinished, and defective in workmanship. All these defects, if real, might be so easily remedied.

"The Egyptian government decided within a year not to buy any more American locomotive engines because they consumed so much more fuel than locomotives from Germany and England.

"There is, however, one dealer in Cairo who makes much profit out of a certain American article. He went to the United States, explained the conditions of trade in Egypt, and personally made arrangements for quick shipments. His goods arrive in fifteen to eighteen days, and freight, duty (8 per cent ad valorem), insurance, etc., only add 13¼ per cent to the first cost. This man—active, honest, and intelligent—is making money. German manufacturers have now deposited similar goods with him to sell for what he can get and to pay for them when he likes. All they ask is to have a market made for them.

"Credit must at least be given until the goods are landed in Egypt. The nervous exporter may insure himself by sending shipping documents through a bank which would deal with the consignee on the arrival of the goods. The advisability of rapid dispatch and quick routes would then be made manifest to him.

"It is useless for manufacturers in the United States to send bundles of catalogs, etc., to consular representatives, begging that they be handed to local dealers and to try and push American trade interests, when they refuse to take the slightest notice of the advice given them in consular reports as to how those same trade interests can be exploited."

Charles T. Barney & Co., Philadelphia, have received so many requests for their circular of July 14, giving an analysis of the U. S. Cast Iron Pipe & Foundry Co. that they have had an additional supply printed. The new circular adds: "The upward movement will unquestionably be followed by greater activity in dividend paying industrials that are selling below their intrinsic merits, and we then expect to see cast iron pipe stocks show a marked improvement."

THE NODULIZING AND DESULPHURIZATION OF FINE IRON ORES AND PYRITES CINDER.[1]

BY ALBERT LADD COLBY.

Those who have had practical experience in smelting large percentages of fine material in blast furnaces, and also in attempting, under these conditions, continuously to produce large outputs of uniformly high-grade iron, as well as those who have listened to explanations as to why the daily blast furnace reports do not show that the desired results are being obtained, appreciate, without explanation, the difficulties attending the smelting of an ore mixture containing considerable proportions of fine ore or other ferruginous materials, as well as the annoyance and expense of handling the large quantities of flue-dust produced.

Under these conditions a process which has been in operation continuously, commencing last summer, and has successfully and economically converted over 24,000 tons of fine ferruginous ores and by-products into "nodules" which have been smelted in blast furnaces, without the difficulties accompanying the use of large proportions of fine materials, and has, furthermore, economically reduced the sulphur present in objectionable quantities in the fine material, is certainly worthy of the attention of the Institute, before which, for many years, it has been the practice first to present for criticism any marked improvement connected with the metallurgy of iron or steel.

The nodulizing plants using this patented process will be first referred to, as in this manner the scope of the application of the process can best be indicated, as also the fact that full advantage of the value of the invention has been obtained by the economic devices used in the various operations. This description of the plants will be followed by a short reference to the patented process.

[1]Abstract of a paper presented at the London (July, 1906) meeting of the Iron and Steel Institute.

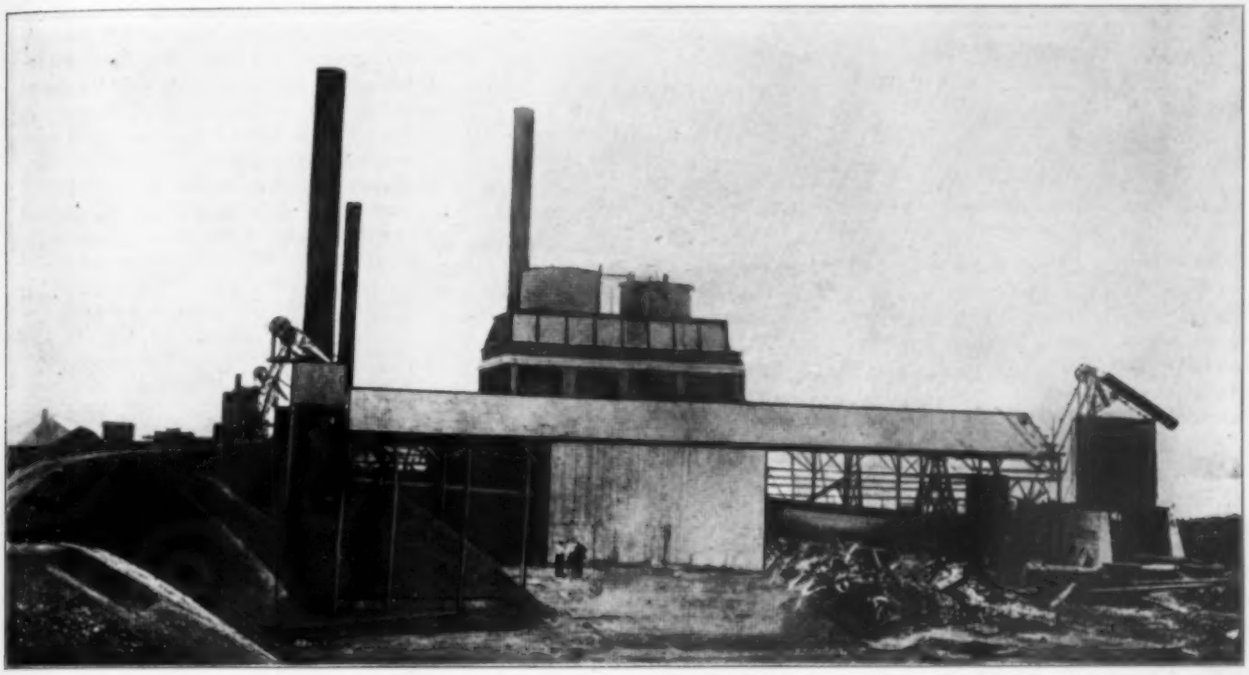


FIG. 1.—GENERAL VIEW OF NEWARK PLANT OF THE NATIONAL METALLURGIC CO., AUGUST, 1905.

General Description of Plants.

Plant at Newark, N. J.—This plant was located with special reference to the delivery of pyrites cinder from various sulphuric acid works, at a low cost of freight, and also at a point convenient for the delivery, by rail, of the product to the blast furnaces of New Jersey and eastern Pennsylvania. It is situated on a 12½-acre tract of land on the meadows, at the junction of the Hackensack and Passaic rivers. On the north side is the Morris canal. Beside dockage facilities, the plant is connected by rail with the Central Railroad of New Jersey, and, indirectly, with the Pennsylvania railroad.

After a practical demonstration had proved that the patented process could be worked continuously and economically, and after the transfer of the patents by the inventor to the National Metallurgic Co. of New Jersey, the above tract of land was purchased in March, 1905, and the plant was built and in operation after four months. A general view of the plant at that time is shown in Fig. 1. It consisted of one rotary kiln of a smaller diameter than has since been adopted as a standard in the more recent plants, which has produced an average of 75 to 90 tons of nodulized desulphurized pyrites cinder per day of twenty-four hours, the time occupied in the experimental nodulizing of other fine materials having greatly interfered with the output. The total amount of nodules shipped to blast furnaces from the Newark plant up to May 1, 1906, has been 9,477 gross tons.

The Newfoundland syndicate, of which the National Metallurgic Co. is one of the constituent companies, owns immense pyrites and copper pyrites deposits in Newfoundland. The holdings include an area of about 125 square miles. Four large deposits are now being actively operated. The company is now delivering at the rate of about 70,000 tons of the pyrites and copper pyrites roasted in the United States per year, which in 1905 amounted to about 600,000 gross tons. It also controls, for the next five years, 80 per cent of the cinder which will be made in the United States

from the roasting of pyrites or copper-bearing pyrites. During the development of the mines now in operation, as well as by the result of surveys of the undeveloped properties, it became evident that the pyrites, as shipped, would contain copper in paying quantities. The addition to the Newark plant of a modernized Henderson copper-leaching plant was therefore at once decided upon, and is now in operation.

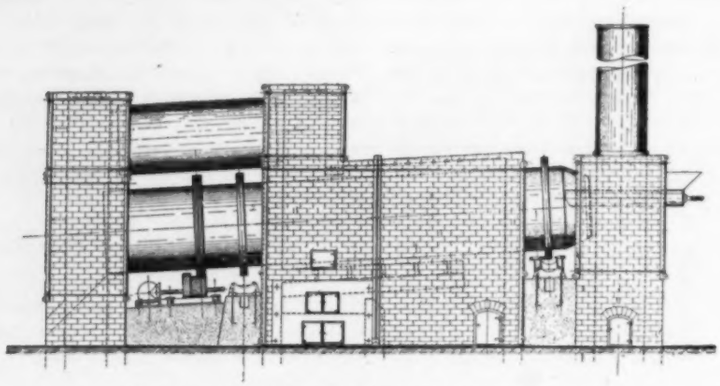


FIG. 2.—COAL DRYER PLANT OF SPECIAL DESIGN.

The Newark plant contains in addition to the copper-leaching plant, which will be briefly referred to later, two other kilns have been installed, so that the plant now consists of three kilns: No. 1, for nodulizing; No. 2, arranged by chimney and flue connections for either nodulizing or roasting with salt; and No. 3, intended entirely for the Henderson roasting. Since early in June, pending the completion of the leaching tanks, the smaller kiln, No. 1, and the standard kiln, No. 2, have together produced continuously some 250 gross tons of nodulized pyrites cinder per day of twenty-four hours.

Plant at Aspinwall, near Pittsburg, Pa.—A plant located at Pittsburg, which will be in operation in August, contains two large nodulizing kilns with an estimated output of 250 tons of nodulized material in twenty-four hours. The kilns will be fired with natural gas. The plant has been located with regard to the nodulizing of the large quantities of flue-dust necessarily made by the many blast furnaces of the Pittsburg district, all of which use a large proportion of Mesabi and other fine Lake Superior hematites in their ore mixture, and also with regard to the convenient delivery of pyrites cinder from sulphuric acid works at Beaver Falls, Titusville, Cleveland, and other interior points.

Plant at Steelton, Pa.—A plant with one kiln was built and put in operation in June, 1905, by the Pennsylvania Steel Co., at its works at Steelton, Pa., operating under a license from the National Metallurgic Co.

This plant has successfully nodulized magnetic concentrates, fine ores from the Mesabi district and the Lake Superior region, and flue-dust from their blast furnaces mixed with the two former materials.

The company is about to build, under its license, another plant of three nodulizing kilns for the treatment of fine ores; the nodulized product, estimated at 450 tons per day of twenty-four hours, will be consumed in its own blast furnaces.

The following analyses are representative of current practice in nodulizing fine magnetites at Steelton:

TABLE I.

Constituents.	Magnetic Concentrates.	Nodules from Magnetic Concentrates.
Iron	59.64	61.25
Sulphur	1.15	0.13
Phosphorus	0.01	0.01
Silica	8.50	8.61

Plant at Hazard, Pa.—The New Jersey Zinc Co. owns the celebrated mine of franklinite at Franklin, New Jersey. At two of its plants, situated at South Bethlehem and at Hazard, Pa., this ore is crushed and roasted on open grates with fine coal, catching the zinc oxide in flues, and smelting the cinder left on the Wetherill grates in a small blast furnace with other ores for the manufacture of spiegeleisen. The fine franklinite, produced in the crushing prior to roasting, as it passed through an 80-mesh sieve, fell through the grates. It was therefore determined to try nodulizing this fine material into uniformly sized lumps. A trial lot of some 300 tons was very successfully nodulized at the Newark plant, with but little or no loss of zinc. The fine franklinite possessed the following chemical composition:

TABLE II.

	Per Cent.
Zinc	17.40
Manganese	8.50
Iron	15.76
Silica	11.37
Lime	16.14
Magnesia	1.44
Loss on ignition	11.18

The nodules of the desired size contained 20.4 per cent of zinc. As the result of this experiment, a nodulizing plant has been erected at Hazard; it will be in operation very shortly.

This experiment shows that the kiln temperatures can be readily controlled, and that material containing volatile metals can be nodulized, practically without any loss of the valuable volatile constituents.

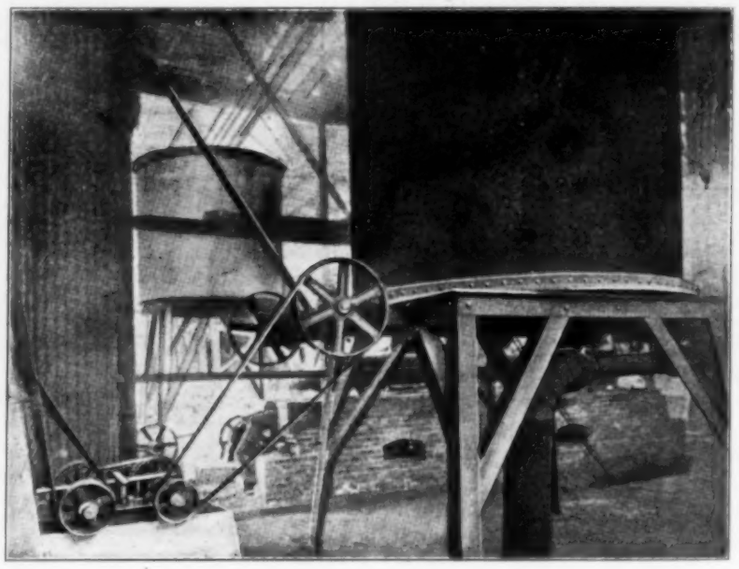


FIG. 3.—STORAGE BIN WITH AUTOMATIC FEEDER AND SCREW CONVEYOR FOR DRY COAL.

Plant at Oxford, Pa.—The Empire Steel & Iron Co. of Catasauqua, Pa., owns and operates a large mine of magnetite, located at Oxford, New

Jersey. The Oxford property covers about 2,500 acres of iron ore lands, and the company controls the mineral rights for several thousand additional acres.

The vein is very well and sharply defined, and extends for at least two miles, at widths varying from 20 to 40 feet. The company is thus fortunate in owning what is probably the largest magnetite ore body in New Jersey. The shipments from one shaft now amount to 8,000 tons per month.

A representative analysis of the run of the mine is as follows:

TABLE III.

	Per Cent.
Iron	60.00
Sulphur	3.00
Phosphorus	0.48
Silica	6.00

There is a considerable quantity of ore somewhat lower in iron than the above, which is also very high in sulphur, as shown by the following analysis. With a view to ascertaining the best mode of dealing with the latter ore, the company obtained a trial run at the Newark plant of the National Metallurgic Co., of some 50 tons of crushed ore.

TABLE IV.

	Crushed Raw Ore. Per Cent.
Iron	57.95
Sulphur	3.58
Phosphorus	0.597
Silica	8.72

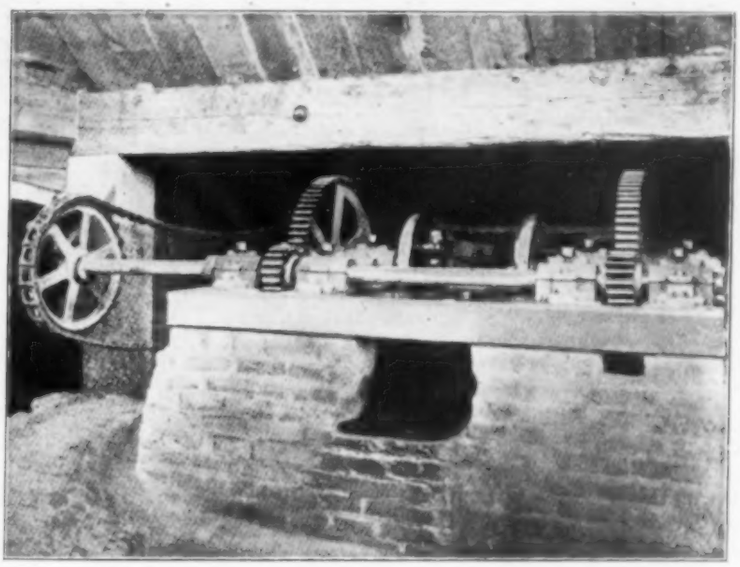


FIG. 4.—AUTOMATIC PLUNGER FEED FOR THE DELIVERY OF THE FINE MATERIAL INTO THE KILNS.

The results of this trial were perfectly satisfactory as far as the nodulizing was concerned, but tests taken every hour during the 10-hour run, while showing low sulphur in some samples, did not show a uniform reduction of sulphur. This was due to the treatment of an insufficient quantity of ore to permit a proper regulation of feed, and consequently the exposure for too short a period of the mixture of ore and tar in the upper portion of the kiln where the roasting takes place.

The Empire Steel & Iron Co. proposes to sink another shaft, so as to increase the monthly output to 16,000 tons and to concentrate all the ore mined, and to nodulize a fine ore carrying about 65 per cent of iron. The concentration will incidentally reduce the phosphorus, as it occurs as apatite, and probably reduce the sulphur from 3.00 to 1.00 per cent, and thus ensure a nodulized magnetite uniformly well below 0.10 per cent in sulphur.

Description of Labor-Saving Devices.

Several economic devices installed in the plants already operating or under construction are, on account of their ingenuity, worthy of notice.

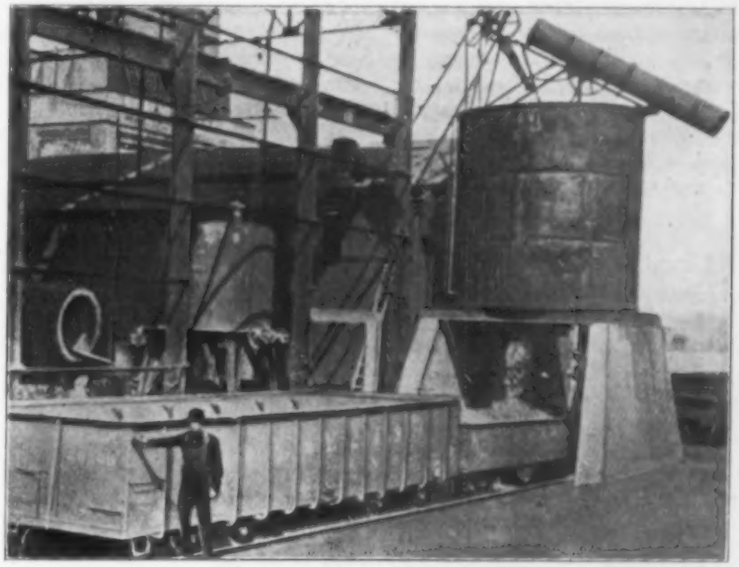


FIG. 5.—STORAGE TANKS FOR RECEIVING NODULES AND DELIVERING THEM ON CARS FOR SHIPMENT

At the Newark plant, dry bituminous coal is burned with a forced draught, the flame or flames entering the lower or discharge end of the kiln. Among the factors which cheapen the use of the pulverized coal is a coal dryer of special design and an automatic speeder and screw conveyor, with the accompanying storage bin for the dry pulverized coal, both shown in Figs. 2 and 3. With these devices the coal is used economically; an automatic and accurate record of the coal consumption is kept, and a perfect combustion maintained between the wide ranges of kiln temperatures used in nodulizing different materials. At the Pittsburg plant natural gas will be used; in the plants erecting or in contemplation, other fuels, solid, liquid, or gaseous, may be found more economical.

An automatic plunger feed of very simple construction ensures a steady delivery, into the kiln, of any desired amount per hour of the material to be nodulized, independent of its fineness, or the amount of moisture it may contain. Uniformity in desulphurization can be thus assured by changing the rate of feed and the quantity of tar entering the kiln, when using materials containing different sulphur percentages, and also by regulating the speed at which the kiln is revolved.

The storage tank, of 150 tons capa-

city, into which the hot nodules are delivered from the kiln by a link belt conveyor is so arranged that the large steel trucks can be filled from the tank by the operation of a single lever, and if for any reason they are not at hand, the nodules, after the storage tank is full, are delivered on stock by an overhead chute, into which the same link belt conveyor can also discharge. These last two devices are illustrated in Figs. 4 and 5.

The general construction of the kilns used in nodulizing may be seen by the illustration shown in Fig. 6, representing kiln No. 3 of the Newark plant blocked up, and ready to be put in position.

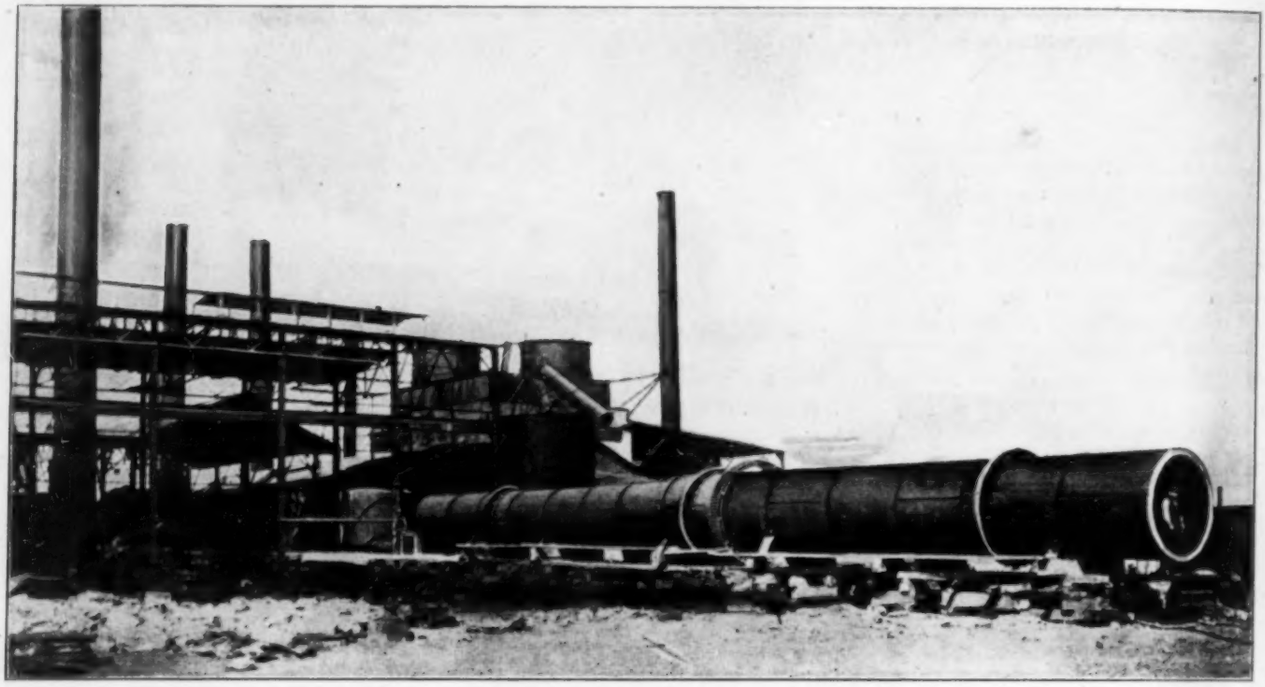


FIG. 6.—NEWARK PLANT. VIEW OF KILN NO. 3, READY TO BE PLACED IN POSITION.

Labor Required for a Two-kiln Plant.

In the continuous operation of a two-kiln plant, with an output of at least 250 tons of nodules per twenty-four hours, for twenty-six days per month, the daily labor required is as follows.

TABLE V.

	Day Shift.	Night Shift.
Boiler and engine—		
Engineer	1	1
Fireman	1	1
Kiln—		
Burner	1	1
Assistant burner	1	1
Helpers for oiling, etc.	2	2
Locomotive crane—		
Engineer	1	0
Fireman	1	0
General labor	1	1
Watchman and timekeeper	1	1
Chemist	1	0

A locomotive crane capable of handling 300 tons of material in twelve hours, and operating within a 25-foot radius, can, on day turn, keep a full day's supply in the storage bins, unload excess material on stock, and also shunt the trucks to and from the sidings, from which point they would be handled by the railway.

The Use of Nodules in Blast Furnaces.

Nodules made from pyrites cinder, concentrated magnetite, and flue-dust, have been used, so far, at six different blast furnace plants, up to, in some cases, over one-half of the ore mixture, and in all cases with such satisfactory results that the demand far exceeds the present sources of supply.

The National Metallurgic Co. is about to erect its third plant, probably of four kilns, and is in active negotiation for putting up plants to convert fine sulphurous iron ores into marketable shape.

Description of the Process.

Having shown by the foregoing description of plants operating, or in process of construction, that the process is well beyond the experimental stage, a brief description of the process itself will now be given.

The invention consists mainly in purifying finely divided metalliferous materials, and forming them into nodules or lumps, by adding to the materials a binder, preferably reducing in character, adhesive at low temperatures (approximately below 600 degrees Fahr.), and volatile at fairly moderate temperatures (approximately 1,200 degrees Fahr.), which binder has an affinity for, and is capable of forming volatile compounds with such impurities as sulphur, arsenic, etc.

In practice, any adhesive hydrocarbon or carbohydrate compound, such as tar, pitch, asphalt, petroleum residuums, dextrine, molasses, glucose, etc., may be used provided it can be made liquid or plastic at comparatively low temperatures and can be readily and cheaply obtained.

The adhesive binder drops, or is sprayed, constantly into the stream of fine ferruginous material as it enters the upper end of an inclined rotary kiln; the material is therefore at once cohered into masses, which by the rotary action break up into nodules or lumps. One per cent or less of an adhesive binder, such as tar, is sufficient.

When the lumps reach a zone of higher temperature the tar combines with the sulphur and both are volatilized, the binder acting as a fuel as well. When the nodules approach the lower and hottest end of the kiln (approximately 2,000 degrees Fahr.), incipient fusion takes place, so that the product is a nodule, permanently cohered without the presence of any extraneous binder reducing the percentage of iron or other valuable metallic constituents contained in the original fine material.

Kentucky's coal output in 1905, according to the Geological Survey, was 8,432,523 short tons, valued at $8,385,232, a considerable increase over 1904.

Census Report on Rolled Iron and Steel

SPECIALLY PREPARED FOR THE IRON TRADE REVIEW.

The bureau of the census of the department of commerce and labor at Washington recently made public the preliminary statistics of the production of rolled iron and steel in the United States in the calendar year ended with Dec. 31, 1904. While much of the information given in the preliminary statement of the census bureau has been in the hands of the public for over a year, very complete statistics of the production of steel ingots and castings, steel rails, wire rods, structural shapes, plates and sheets, and some other forms of finished rolled iron and steel in 1904 having been published by the American Iron and Steel Association in the spring and summer of 1905, there are many valuable details which appear in the census compilation which are not touched upon by the association in its statistical reports. There are also, it may be well to add, some features about which the association gives full details which the bureau of the census would do well to adopt. Below will be found some of the leading features of the census report:

Number of Establishments and Capital Invested.—According to the preliminary summary of the census bureau the number of establishments which manufactured steel ingots or castings or produced hot rolled iron or steel, either in partly finished or wholly finished forms, has decreased from 438 in the census year ended on May 31, 1900, to 415 in the calendar year ended on Dec. 31, 1904, but the capital invested in plants of this character has increased from $429,960,043 in 1900 to $760,182,310 in 1904. This is an increase in a little over four and one-half years of $330,222,267, or 76.8 per cent. From 1890 to 1900 the increase amounted to only $151,400,212, or 54.3 per cent. In 1890 the capital invested amounted to only $278,559,831. The enormous increase from 1900 to 1904 seems hardly credible. Our rolling mill and steel works industry has been making almost phenomenal progress since the opening of the present century, but men who keep in touch with the industry will be puzzled to know just where the reported increase of over $330,000,000 has been invested. It may be well to mention here that capital invested covers land, buildings, machinery, tools and implements, bills receivable, unsettled ledger accounts, raw material, stock in process of manufacture, finished products and cash on hand, and other sundries. The figures for 1900 do not include rented property, the value of which amounted to $11,835,940.

Salaried Officials and Wage Earners.—The number of salaried officials employed in 1904, which included all salaried officers of corporations as well as managers, superintendents, foremen, clerks, and all other salaried employes, numbered 14,330, as compared with 7,442 in 1900, an increase of 6,888, or over 92 per cent. The salaries paid these officials was $17,861,495 in 1904 and $9,421,868 in 1900, an increase of $8,439,627, or over 89 per cent. These officials were paid on an average a yearly salary in 1900 of $1,266, while in 1904 their salaries averaged $1,246 yearly, or $20 less than they were paid at the opening of the present century. The average number of wage earners employed in 1900 was 183,023, while in 1904 it was 207,563, an increase of 25,540, or 13.4 per cent. These workers in 1900 were paid $102,238,692 in wages, or an average of $558 per employe, as compared with $122,491,993 in 1904, or an average of $590 per wage earner, an increase of $32 each, or a little less than 6 per cent.

Miscellaneous Expenses.—In 1904 the miscellaneous expenses, which cover the amount paid for rent of works, rent of power and heat, taxes, rent of offices and buildings other than the works, interest, insurance, ordinary repairs of buildings and machinery (which includes the cost of material used in lining Bessemer converters, cost of fire bricks for cupolas, ladles, mixers, etc., open-hearth steel furnaces, etc., the cost of rolls in rolling mills, etc.), advertising, traveling expenses, and all other miscellaneous expenses of every kind, amounted to $37,373,471, while in 1900 similar expenses amounted to $24,795,663, an increase of $12,577,808, or 50.7 per cent.

Materials Used.

With the exception of iron ore, and perhaps coal, coke, and other fuel, there was a marked decrease in 1904 as compared with 1900 in the cost per ton of the various materials used by rolling mills and steel works, the total cost of all materials in 1904 amounting to $441,204,432, as compared with $390,568,117 in 1900, an increase of $50,636,315, or 13 per cent. The quantity and value of each material used are given below:

Iron Ore.—There were 549,995 tons of iron ore consumed in 1904, valued at $2,396,792, or $4.35 per ton, against 340,028 tons consumed in 1900, valued at $1,326,395, or $3.90 per ton, an increase in tonnage of 209,967 tons and in value of $1,070,397. The increase in the cost per ton of iron ore in 1904 over 1900 was 45 cents, or over 11 per cent.

Pig Iron, Etc.—The pig iron consumed by rolling mills and steel works in 1904, including spiegeleisen, ferro-manganese, ferro-silicon, etc., amounted to 12,191,228 tons, valued at $172,101,436, or $14.11 per ton, while in 1900 the quantity of these products consumed amounted to 10,410,281 tons, valued at $151,042,348, or $14.50 per ton, showing an increase in tonnage of 1,780,947 tons, and an increase in value of $21,059,088, but a decrease in cost per ton of 39 cents, or over 2.6 per cent.

Scrap and Iron Rails.—The scrap iron and steel, including old iron and steel rails, consumed in 1904 amounted to 5,124,277 tons, valued at $67,601,248, or over $13.19 per ton, while in 1900 the consumption of the same kind of materials amounted to 4,113,287 tons, valued at $66,670,855, or $16.20 per ton, an increase in tonnage of 1,010,990 tons and an increase in value of $930,393. There was a decrease in cost, however, in 1904 as compared with 1900, of $3.01 per ton, or over 18 per cent.

Purchased Hammered Blooms, Muck Bar, etc.—There were consumed in 1904 287,920 tons of purchased hammered iron ore blooms, pig and scrap blooms, muck and scrap bar, and imported Swedish billets or bars, valued at $6,847,858, or $23.78 per ton, as compared with 194,049 tons consumed in 1900, valued at $5,686,514, or almost $28.79 per ton, an increase in consumption of 93,871 tons and in value of $1,161,344, but a decrease in cost of $5.01 per ton, or over 17 per cent.

Purchased Ingots, Blooms, Billets, Etc.—In 1904 there were consumed 4,632,257 tons of purchased ingots, slabs, blooms, billets, tinplate bars, and sheet bars, against 3,682,407 tons in 1900, an increase of 940,850 tons. These ingots, blooms, etc., were valued at $103,420,970 in 1904, as compared with $92,123,412 in 1900, an increase of $11,297,558. The average cost per ton of the ingots, blooms, etc., was $22.36 in 1904, against $25.01 in 1900, a decrease of $2.65 per ton, or over 10 per cent.

Fuel.—The cost of all kinds of fuel

in 1904, which included anthracite and culm, bituminous coal and slack, coke, charcoal (used by rolling mills which operated bloomaries for the production of charcoal iron blooms for their own consumption), natural gas, and fuel oil, amounted to $35,192,961, against $22,342,390 in 1900, an increase of $12,850,571. In 1904 the details of the cost of the various fuels are not given; neither, unfortunately, is the tonnage. In 1900, however, the rolling mills and steel works consumed 944,018 tons of anthracite coal and culm, valued at $1,220,694; 10,944,046 tons of bituminous coal and slack, valued at $14,679,804; 827,246 tons of coke, valued at $2,014,390; 2,250,022 bushels of charcoal, valued at $170,345; and 1,302,615 barrels of fuel oil, valued at $1,158,748. In addition the natural gas consumed in 1900 was valued at $3,098,409. The cost for fuel per ton of products made in 1904 was $1.93, while in 1900 it was $1.48. This is an increase of 45 cents per ton, or over 30 per cent.

Materials Not Above Enumerated.—The cost of all materials used by rolling mills and steel works in 1904 which are not enumerated above, and in which are included lubricating oil, waste, and other supplies consumed in running machinery, amounted to $53,643,167, as compared with $51,376,203, an increase of $2,266,964, or over 4 per cent.

Products.

Value of All Products.—The total value of all products turned out by the 415 establishments which operated rolling mills or steel works in 1904 amounted to $673,965,026, as compared with products valued at $596,689,284 turned out by the 438 establishments which were active in 1900, an increase in value of $77,275,742, or 13 per cent. In the total amounts reported for both years are included the value of wire, wire nails, cut nails, bolts, nuts, rivets, washers, forged spikes, wrought iron and steel pipe and tubes, seamless drawn tubes, clinched pipe and tubes, brazed pipe and tubes, gray iron and malleable castings, ordnance, springs, horse and mule shoes, stamped ware, machinery, saws, scoops, shovels, etc., etc., when one or more of these products were made by a rolling mill or a steel plant.

Tonnage of All Products.—The tonnage of all rolled and forged products, omitting cut nails, wire nails, bolts, nuts, rivets, forged spikes, washers, and all other similar articles which are not strictly speaking products of a rolling mill, amounted to 18,216,639 gross tons in 1904, as compared with 15,040,129 tons in 1900, an increase of 3,176,510 tons. The value of these products amounted in 1904 to $584,299,439, as compared with $510,388,433 in 1900, an increase of $73,911,006. The average value per ton of this class of products in 1904 was $32.07, as compared with $33.93 in 1900, a decrease of $1.86 per ton, or over 5 per cent. Below will be found details for the rolled and forged products as classified by the census bureau.

Rails.—The production of all kinds of rails in 1904, including Bessemer steel, open-hearth steel, and iron (nickel steel of course being included), amounted to 2,294,135 tons, valued at $60,737,078, as compared with 2,251,337 tons in 1900, valued at $46,533,159. This is an increase in value of $14,203,919 and in quantity of 42,798 tons. The average value of the rails rolled in 1904 was $26.47, as compared with $20.67 in 1900. The figures for 1904 include 99,530 tons of renewed or rerolled rails, valued at $2,480,328, or $24.92 per ton. In 1900 there were 28,717 tons of Bessemer steel rails renewed by one plant in Illinois and one plant in Kansas. These rails, however, were renewed by rail mills for the owners of the rails, and their value is not included in the rail value reported for the census year 1900. The amount received by the two rail mills referred to above for renewing these rails was reported under customs work and repairing.

Iron and Steel Bars, Rods, and Wire Rods.—Sheet and tin plate bars are not included in this classification. The production of merchant bars, rods, and wire rods amounted in 1904 to 4,225,239 tons, valued at $136,797,003, against 3,409,746 tons, valued at $136,126,750, in 1900, an increase of 815,493 tons in quantity and $670,253 in value. The average value per ton was $32.37 in 1904 and $39.92 in 1900, a decrease of $7.55 per ton, or almost 19 per cent. Unfortunately in 1904 the census bureau has grouped wire rods with merchant bars, thus rendering it impossible to compare the production or value of the wire rods made in 1904 with the production and value of the wire rods made in 1900. Nor can the production and value of the merchant bars made in 1904 be compared with the merchant bars and rods made in 1900. As the manufacture of wire rods and merchant bars is a very important branch of the iron and steel industries it is to be hoped that when the bureau comes to issue its complete report it will give full details for both industries. In the census for 1900 separate reports were rendered for merchant bars and wire rods. The merchant bars rolled in that year amounted to 2,493,159 tons, valued at $100,597,221 or $40.35 per ton. In the same year there were rolled 916,587 tons of wire rods, valued at $35,529,529, or an average of $38.76 per ton.

Structural Shapes.—The production of structural shapes in 1904 amounted to 954,537 tons, valued at $32,730,901, as compared with 856,983 tons, valued at $29,361,522 in 1900. The average value per ton was $34.29 in 1904 and $34.26 in 1900, a difference of only 3 cents per ton. In its preliminary statement for 1904 the bureau of the census has not reported separately, as was done in 1900, the quantity and value of the Bessemer, open-hearth, and iron structural shapes made. In 1900 there were 27,091 tons of iron structural shapes rolled, valued at $1,051,556, or an average of $38.82 per ton; 263,800 tons of Bessemer steel shapes, valued at $8,381,717, or an average of $31.77 per ton; and 566,092 tons of open-hearth shapes, valued at $19,928,249, or an average per ton of $35.20. In 1900 the open-hearth shapes rolled from basic steel were not separated from those rolled from acid steel, but undoubtedly much the larger part was rolled from basic steel. Incidentally it may be here mentioned that the increasing use of reinforced concrete in the construction of large buildings will undoubtedly reduce somewhat in the years to come the consumption of structural material. Down to the present year, however, reinforced concrete has apparently had no appreciable effect on the production of structural shapes, as in 1905 the statistics of the American Iron and Steel Association show that 1,660,519 tons were rolled. This was the greatest output in the history of the country, and was 360,193 tons in excess of the production reported by the association in 1902, the next highest year, when 1,300,326 tons were rolled.

Hoops, Bands, Cotton-ties, and Skelp.—In 1904 the production of hoops, bands, cotton-ties, and skelp amounted to 1,894,913 tons, valued at $59,540,212, as compared with 1,195,189 tons, valued at $49,159,747, in 1900, an increase in quantity of 699,724 tons and in value of $10,380,465. The average value per ton was $31.42 in 1904, as compared with $41.13 in 1900, a decrease of $9.71 per ton, or over 23 per cent.

Plates and Sheets.—Nail plate, tack plate, black plates (or sheets) for tinning, and armor plates are not included by the census bureau with plates and sheets. The production of plates and sheets in 1904 amounted to 1,856,469 tons, against 1,488,066 tons in

1900, an increase of 368,403 tons. The value of the plates and sheets rolled in 1904 was $77,802,001, as compared with $68,109,223 in 1900, an increase of $9,692,778. The average value per ton in 1904 was almost $41.91, while in 1900 it was $45.77, a decrease of $3.86 per ton, or over 8 per cent.

Black Plates (or Sheets) for Tinning.—The total production of black plates (or sheets) for tinning in 1904 was 504,025 tons, as compared with 394,014 tons in 1900, an increase of 110,011 tons. The value of the 1904 output was $25,297,079, or $50.19 per ton, as compared with a value of $20,967,806 in 1900, or an average value per ton of $53.22. This is a decrease in the average value per ton of $3.03, or almost 6 per cent. Evidently a large part of the black plates (or sheets) rolled in 1904 were not used in that year in the manufacture of tin plates or terne plates, as the census bureau states in its report on the tin plate industry that 455,182 tons of black plates (or sheets) were coated with tin or lead in 1904. This would leave practically 50,000 tons of black plates (or sheets), or about one-tenth of the total production, in the hands of manufacturers at the close of the year. The total production of black plates (or sheets) reported by the census bureau for 1904 is very much larger than the quantity reported by the American Iron and Steel Association for the same year, the output reported by the association being 472,569 tons, or 31,456 tons less than the total reported by the census bureau. In its report for 1900 the census bureau separated Bessemer steel black plates from open-hearth black plates. The Bessemer plates made in that year amounted to 355,077 tons, valued at $18,673,312, or $52.59 per ton, while the open-hearth production amounted to 38,937 tons, valued at $2,294,494, or $58.93 per ton. Apparently iron black plates (or sheets) were not reported to the census bureau in 1900.

Blooms, Slabs, Billets, Tinplate Bars, and Sheet Bars Produced for Sale.—In 1904 there were 4,825,339 tons of blooms, slabs, billets, tinplate bars, and sheet bars produced for sale, as compared with 4,172,286 tons in 1900, an increase of 653,053 tons. In 1904 these products were valued at $109,655,477, as compared with $96,321,887 in 1900, an increase of $13,333,590. The average value per ton in 1904 was $22.72, as compared with $23.06 in 1900, a decrease of only 34 cents per ton. These blooms, slabs, billets, etc., were chiefly purchased by rolling mills for further manipulation between hot rolls. When rolled into finished products by their purchasers they are again reported in these forms to the census bureau. In the grand total for rolled and forged products as reported by the census bureau there is therefore a duplication in quantity of perhaps 4,800,000 tons in 1904 and in value of perhaps $109,000,000. In 1900 the duplication amounted to about 4,172,000 tons in quantity and to about $96,000,000 in value. In addition in 1900 over 200,000 tons of muck and scrap bar were produced for sale, valued at almost $6,000,000. In 1904 probably about the same quantity of the same material was similarly produced. Practically all this muck and scrap bar was purchased by operators of rolling mills for further manipulation between hot rolls. The materials rolled from it were again reported to the census bureau and more duplications in tonnage and value resulted. It would perhaps be perfectly fair to assume that from 25 to 30 per cent of duplications appear in the tonnage and value reported for rolled and forged materials by the census bureau in both 1900 and 1904. It is this element of duplication in cost of materials and products that materially detracts from the value of the census figures in almost every branch of industry. As a matter of fact in the iron and steel industries all figures relating to the quantity and cost of materials used and the quantity and value of products turned out are very much overstated, the duplications in these two branches of the census inquiry swelling the totals in each case to perhaps one-third more than their true size.

Miscellaneous Rolled Products.—The production of rolled products not heretofore enumerated amounted in 1904 to 800,153 tons, against 810,454 tons in 1900. Their value in 1904 was $29,103,141, as compared with $28,348,592 in 1900. This is a decrease in production of 10,301 tons in 1904 as compared with 1900, but an increase in value of $754,549. The average value per ton in 1904 was $36.37, while in 1900 it was $34.97, an increase per ton of $1.40 in 1904. In the latter year miscellaneous products are grouped in a general classification, but in 1900 the grouping was much more liberal. The production of rolled axles was separately reported; so also was the production of muck and scrap bar produced for sale, nail plate, and tack plate. The miscellaneous classification in 1900 included splice bars, fish plates, strips, socket iron and steel, rolled blanks suitable for drawing into seamless tubes, and other special forms. The production of rolled axles in 1900 amounted to 56,339 tons, valued at $2,757,051, or $48.94 per ton; nail plate, 81,101 tons, valued at $2,466,340, or $30.41 per ton; tack plate, 16,563 tons, valued at $650,218, or $39.25 per ton; muck and scrap bar produced for sale, 203,681 tons, valued at $5,940,587, or $29.16 per ton; splice bars, fish plates, strips, etc., 506,880 tons, valued at $19,202,606, or $37.88 per ton. The above details for 1900, which are taken from the special report on iron and steel for the census of 1900, foot up 864,564 tons, valued at $31,016,802, and not 810,454 tons, valued at $28,348,592, as reported in the preliminary statement of the census bureau.

Steel Ingots Produced for Sale and Steel Castings.—The production of steel ingots for sale and steel castings amounted to 483,729 tons in 1904, against 280,863 tons in 1900, an increase of 202,866 tons. The value of these products in 1904 was $24,585,446, as compared with $17,391,038 in 1900, an increase of $7,194,408. The inclusion of steel castings, a finished product, with steel ingots, a crude product, is a rather peculiar procedure, especially when it is remembered that steel castings are fast becoming a very important factor in the steel trade. In 1900 the two products were separately reported. In that year there were 103,707 tons of steel ingots produced for sale, valued at $2,781,145, or an average per ton of $26.81. In the same year there were 177,156 tons of steel castings made, valued at $14,609,893, or an average value per ton of $82.47. Of the total production of steel castings, 3,761 tons, valued at $322,465, or an average per ton of $85.74, were Bessemer castings; 165,529 tons, valued at $13,004,591, or $78.56 per ton, were acid and basic open-hearth steel castings; 3,643 tons valued at $486,448 or $133.53 per ton, were crucible steel castings; and 4,223 tons, valued at $796,389, or $188.58 per ton, were castings made by special and patented processes (McHaffie, Hadfield, etc.). Of the total output of open-hearth steel castings in 1900, 129,005 tons, valued at $10,376,344, or $80.43 per ton, were made by the acid process, and 36,524 tons, valued at $2,628,247, or $71.96 per ton, were made by the basic process. It is to be regretted that this classification was not continued in 1904. The production of all kinds of steel castings in 1904, according to the statistics of the American Iron and Steel Association, was 330,211 tons. Comparing this production with that of the census year 1900, an increase of over 153,000 tons is shown. While the steel casting industry is a comparatively new industry it will be seen from the above

figures that it is growing rapidly and that it is now a very important source of revenue to our steel makers. The steel casting production for 1905, which was recently made public by the association, shows what rapid progress the industry has made since 1900, the total production in 1905 having amounted to 560,767 tons, an increase over 1900 of 383,611 tons, or over 216 per cent. An industry of this magnitude is certainly worthy of individual mention in the statistical compilations of the census bureau.

Forged Products.—According to the preliminary statement of the census bureau the production of all kinds of forged iron and steel products in 1904 amounted to 378,100 tons, as compared with 181,191 tons in 1900, an increase of 196,909 tons. The value of these forged products in 1904 was $28,051,101, as compared with $18,068,709 in 1900, an increase of $9,982,392. The average value per ton of the forged products in 1904 was $74.18, as compared with $99.72 in 1900, a decrease of $25.54, or over 25 per cent. Forged products are not separately reported in the census statement for 1904, but in 1900 they included 15,302 tons of armor plate and gun forgings, valued at $7,526,479, or $491.86 per ton; 46,267 tons of hammered axles, valued at $1,725,886, or $37.30 per ton; and 65,512 tons of shafting, piston rods, connecting rods, cranks, machinery, and marine, steamboat, railroad, and other forgings, valued at $6,148,134, or $93.85 per ton. The totals given for the year 1900 for forged products in the preliminary statement of the census bureau do not agree with the totals of the details for 1900 given above, the difference amounting to 54,110 tons, and to $2,668,210 respectively. The details given by us are all taken from the special report on iron and steel for 1900.

Unclassified Products, not Rolled.—In addition to the rolled and forged materials heretofore enumerated there were products valued at $89,665,587 turned out by rolling mill and steel works in 1904, as compared with similar products valued at $86,300,851 in 1900. This is an increase in 1904 over 1900 of $3,364,736. The tonnage of these products was not ascertained in either year. In the totals given above are included wire, wire nails, cut nails, bolts, nuts, rivets, wrought pipe, seamless drawn tubes, cast pipe, gray pipe and malleable castings, horse and mule shoes, machinery, agricultural implements, saws, screws, shovels, spades, scoops, etc., etc., made by rolling mills or steel works usually from materials produced in their own plants. Products other than iron or steel are also included in a few instances. When these products have been made from materials rolled in the mill of the establishment reporting, the value of the rolled material used in their manufacture is reported under its proper classification and the increased value given to the finished rolled products by their further manipulation is included in the above totals. For instance, the value of the iron or steel from which bolts are made would be reported under merchant bars, but the difference in value between the rolled merchant bars and the finished bolts would be credited to unclassified products. So also with wire, wire nails, cut nails, wrought pipe, etc. In every instance the value of the rolled material used in the manufacture of these products is given under the proper rolled classification. The value credited to bolts, wire, wire nails, cut nails, etc., is the difference between the value of the rolled material used in their manufacture and the value of the bolts, wire, wire nails, etc., turned out. If this were not done the further duplication in the census values in the iron and steel industry would amount to hundreds of millions of dollars. In wire alone the duplication would run up to perhaps $100,000,000, as practically all the wire rods rolled are drawn into wire, and the wire manufactured into nails, rivets, chains, fencing, and the hundred and one indispensable articles which are now made from this important drawn product.

Summary.

Summarizing the expenses of the rolling mills and steel works in 1904 as compared with 1900 we have the following exhibit:

Expenditures.	1904.	1900.
Salaries of officers.	$ 17,861,495	$ 9,421,868
Wages	122,491,993	102,238,692
Mis. expenses	37,373,471	24,795,663
Materials used	441,204,432	390,568,117
Total expenses	$618,931,391	$527,024,340

The increase in all kinds of expenses in 1904 as compared with 1900 amounted to $91,907,051, or over 17 per cent.

In the above statement it will not escape notice that no allowance is made for depreciation of plant, erection of new buildings, installation of new machinery, and other expenses necessary to keep a rolling mill or a steel plant abreast of the times. Improvements of this character according to census methods are included in capital invested, the value of the plant being increased in proportion to the expenditures made for improvements, enlargements, etc.

Deducting the expenses in 1904 and 1900 from the value of the products in the same years gives the following results.

Receipts.	1904.	1900.
Value of all rolled products	$531,662,892	$474,928,686
Value of steel ingots produced for sale and steel castings	24,585,446	17,391,038
Value of all forged products	28,051,101	18,068,709
Value of all other products	89,665,587	86,300,851
Total receipts	$673,965,026	$596,689,284
Deduct expenditures	618,931,391	527,024,340
Approximate gain	$ 55,033,635	$69,664,944

Notwithstanding the fact that the business done in 1904 was over $77,000,000 greater than the business done in 1900 the gain over expenses in 1900 was almost $15,000,000 greater than in 1904.

Omitting all extraordinary expenses of the character heretofore mentioned, but including all ordinary expenses for buildings and machinery (that is the cost of materials used in lining Bessemer converters, ladles, mixers, etc., the cost of fire bricks for cupolas, the cost of bricks for open-hearth furnaces, the cost of repairs for rolling mill and steel works machinery, the cost of rolls for rolling mills, and all other similar expenses), the operators of rolling mills and steel works apparently earned in 1904 about 7.2 per cent on the capital invested, as compared with about 16.2 per cent in 1900. On the business transacted in 1904 the approximate gain over expenses was a little over 8.1 per cent, while in 1900 the similar gain was over 11.6 per cent. The census showing of profit for the rolling mill and steel works industry in 1904, like the showing for the blast furnace industry, is rather disappointing. It is to be regretted that the census bureau did not collect the information for the calendar year 1905, instead of for the calendar year 1904.

Attention has already been called to the enormous increase in the capital invested in 1904 as compared with the capital invested in 1900 and 1890. The true test of the correctness of the 1904 totals for capital invested will be made when the statistics for individual states are made public. In this connection the fact should not be lost sight of that the capital invested in the rolling mill and steel works industries does not include the capital invested by operators of rolling mills or steel works in blast furnaces, coke ovens, ore lands, coal lands, etc., as for each of these industries the census bureau collects information concerning capital invested, employes,

wages paid, consumption of materials, quantity and value of products, etc., etc.

Comparing the production of some of the leading rolled iron and steel products in 1904 with the production of the same products in 1900, we have the following results, in gross tons:

Products—Tons	Production in 1904.	Production in 1900.	Increase.
Rails	2,294,135	2,251,337	42,798
Merchant bars and wire rods	4,225,239	3,409,746	815,493
Structural shapes	954,537	856,983	97,554
Hoops, bands, and cotton ties	1,894,913	1,195,189	699,724
Plates and sheets	1,856,469	1,488,066	368,403
Black plates (or sheets) for tinning	504,025	394,014	110,011
Rolled blooms, billets, etc., produced for sale	4,825,339	4,172,286	653,053

Comparing the values of these products for the same years, we have the following showing:

Products.	Production in 1904.	Production in 1900.	Increase.
Rails	$60,737,068	$46,533,159	$14,203,919
Merchant bars and rods	136,797,003	136,126,750	670,253
Structural shapes	32,730,901	29,361,522	3,369,379
Hoops, bands, and cotton ties	59,540,212	49,159,747	10,380,465
Plates and sheets	77,802,001	68,109,223	9,692,778
Black plates (or sheets) for tinning	25,297,079	20,967,806	4,329,273
Rolled blooms, billets, etc., produced for sale	109,655,477	96,321,887	13,333,590

The average value per ton of these products in the two periods was as follows:

Products—Values.	Average in 1904.	Average in 1900.	Increase.	Decrease.
Rails	$26.47	$20.67	$5.80	
Merchant bars and wire rods	32.37	39.42		$7.55
Structural shapes	34.29	34.26	.03	
Hoops, bands, and cotton ties	31.42	41.13		9.71
Plates and sheets	41.91	45.77		3.86
Black plates (or sheets) for tinning	50.19	53.22		3.03
Rolled blooms, billets, etc., produced for sale	22.72	23.06		.34

The above statement shows that in two cases only—rails and structural shapes—were the average prices of finished and partly finished rolled iron and steel products higher in 1904 than they were in 1900. The very low average price for steel rails in 1900 was due to the fact that the details given for that year by the census bureau cover many months of 1899, in the early months of which year orders for steel rails were taken as low as $17.50 and $18.50 per ton. During the latter part of 1899 and in the early part of 1900 the price of steel rails reached $35 per ton; but hundreds of thousands of tons had been sold by our steel rail makers in 1898 and 1899 for delivery in 1899 and 1900 at the very low prices prevailing at the time the orders were placed. As these rails were largely delivered in the census year ending May 31, 1900, the low value reported for them brought down the average rail price for the census year 1900 to $20.67 per ton. These abnormal conditions did not prevail in the structural steel trade in 1900, and the difference in price between the two periods therefore amounted to only 3 cents per ton. In all other lines of manufacture there was a big decline in iron and steel prices in 1904 as compared with 1900, especially in hoops, bands, and cottonties, merchant bars and wire rods, and plates and sheets.

ELECTRIC MOTORS IN STEEL MILLS.

In connection with an article on the 1,500 horsepower motors lately installed in roll mill No. 3, at the Edgar Thomson Steel Works, it is interesting to note the progress of electric power development for steel mill service which has all taken place in the last fourteen or fifteen years. Between fourteen and fifteen years ago, the first installation of electric power for use in steel mill work was made in one of the mills of the Pittsburg district. The original purchase consisted of a 75-kilowatt belt driven generator and a few small motors. The success of this equipment was such that it was very shortly supplanted by two 187.5-kilowatt belt driven generators. Within about five years from the date of the original installation two 400-kilowatt engine driven generators were added to the installation; within two or three years thereafter two 800-kilowatt engine driven generators, and still later two 1,500-kilowatt generators were added; and when the other apparatus now arranged for is installed, the plant will have a capacity fully one hundred times that of the original installation, made only about fourteen years ago.

As would naturally be expected the growth in the amount of electric power used has been largely due to a broader scope of purposes for which it has been employed. At first motors were looked upon as a means to an end for supplying such minor power as was required at points where steam was not available, *i. e.* for certain small conveying tables and a few traveling cranes, the steam engine receiving the preference where steam could be obtained and the engine made to do the work. The motors, however, gradually proved to be the more reliable, and not only more reliable but vastly more economical.

Additional uses were rapidly found for electric motors in connection with steel mill work. All conveying tables were gradually equipped with motors. Shop cranes and yard cranes were added. Engine driven shears were thrown out and electrically driven shears substituted. Electrically driven charging machines superseded hand charging, until at the present time nearly every modern steel mill uses electrical power for all operations except for driving the main rolls.

The step taken by the Edgar Thomson Works in installing the two 1,500-horsepower motors referred to is possibly the initiative in the final supplanting of direct steam power by electric motors for steel mill operation.

It is perhaps not generally known that if all of the heat energy represented by the coke or fuel consumed in the blast furnaces could be utilized, sufficient mechanical power could be had from it to manufacture the iron produced by such furnaces into merchant shapes. At the present time certain mills are recovering part of the waste fuel from their blast furnaces, which is given off from the furnaces as a very low grade gas, by burning it under steam boilers, using the steam generated for the operation of their electric generators, blowing engines, rolling mill engines, etc. Even with the low economy of the steam engine, there is one mill with which we are acquainted which does nearly its entire manufacturing process with power so obtained.

With the advent of the modern large-sized gas engine and the application of large electric motors for roll driving a still more rapid development of electric power in connection with rolling mill work may, we believe, reasonably be expected within the next few years. With the increased economy of the gas engine over its steam predecessor, the waste blast furnace gases will be able to furnish all the electric power required for the carrying out of the operations incidental to the manufacture of the finished iron and steel product through the use of electric motors.—*The Electric Journal.*

Some interesting exploratory work is about to be undertaken at Ishpeming Mich., by the Cleveland Cliffs Iron Co., as a result of which what is now a basement may become a mine shaft. To get a line upon the continuation of its hard ore deposits to the westward, diamond drill operations are to be started.

Important Operations in Lake Superior Mines.

Office of THE IRON TRADE REVIEW.
Duluth, August 31.

The washing of ore has been inaugurated by the Oliver Iron Mining Co., at its Bovey location and with the completion of the Duluth, Missabe & Northern branch from Alborn, this week, which brings shipping within a definite future, continuous operation of the washing machine is probable.

Three weeks ago the boiler house of the Winifred mine was burned to the ground. They have quite a bit of water there and with the stopping of the pumps coincident with the stoppage of the steam supply the mine was flooded, the water filling the main to a depth of 70 feet or within 60 feet of the top of the shaft. The boilers were placed in commission as soon as possible and pumping started while the frame boiler house was being rebuilt. Good headway was made but the boilers, which are old wood burning vertical affairs brought from the old Day mine, began to leak, so that they had to be shut down for several hours. It is expected, however, that within a week the mine will be clear.

The Susquehanna mine has just received the new 125-horsepower McEwen tandem compound engine for driving the generators which are to supply electricity for the electric lighting and tramming system soon to be installed there. The incorporators of the Mariska Iron Co., which came into existence July 1, with the exception of Frank Crassweller, have just organized another iron company with similar objects and scope. The Monica Iron Co. is to have a period of duration from August 1 through a term of thirty years and its charter provides for the mining, purifying and manufacturing of iron ores and other minerals. The incorporators are A. M. Miller Jr. and Geo. P. Tvedt of Duluth, and A. B. Coates of Virginia. The company will develop some lands it owns on the eastern Mesabi.

The Albany Mine.

The Albany mine, the appearance of which at about the time last year when the mills on the first level had been worked down is shown in the accompanying cut, is shipping about 2,500 tons a day. During last winter the shaft was sunk to the second level and drifts opened at a depth of 200 feet or about 160 feet below the top of the ore. Eight mills have been opened down through, six of which are in operation, but as in all milling propositions the amount of ore capable of being taken out depends on the capacity of the haulage system down below and the freedom with which the ore runs down through the mills. Last year the wet weather made the Albany a hard proposition and the mine was not only well filled with water, but the ore caked in the raises badly. This year the work has proceeded in

THE ALBANY MINE SHOWING FIRST LEVEL NEARLY WORKED OUT.

much better fashion. During the winter also a new shaft north of the old one was built to hoist the ore, which was taken out on the first level by steam shovel. The north end of the pit has been pretty well cleaned up and next week the shovel will begin cutting in on the large island of ore at the opposite end. Tracks are now being laid along the east bank preparatory to stripping the land north of the present mine and enlarging the pit. The addition will be mined in the same way as the other workings and it is expected that October will see a shovel in ore in the new cut. Both the Utica and Albany mines are superintended by Robert Murray.

Stripping at the Pillsbury.

At the Pillsbury the stripping has opened the mine to about twice its former size and a long cut has been made in opening an approach. The shaft house of the Pillsbury shown in the accompanying view was used when the mine was altogether an underground proposition and up to this time when the ore has been shoveled in the pit by hand, but with the beginning of steam shovel mining will have to be abandoned. A number of stock piles still remain to be shipped. The Myers and Shenango still have the major portion of theirs, the Laura is shipping slowly with a somewhat decrepit shovel, the Glen and Clark have large piles on hand, as has also the Iroquois. The Lincoln and Commodore have large amounts still to get rid of, and it would seem that if more cars are not available than are necessary to take care of the mine production, which is the case now, some of the mines will have to reduce their production in order to get the stock piles out of the road.

The Agnew mine of the International Harvester Co., Capt. Trewhella, has been a steam shovel proposition for a year, though the pit is pretty deep and could not be opened in the best possible manner. One bank of the mine is shown which, however, does indicate the difficulties of its operation. Considerable taconite was encountered and one section will have to be milled. Considerable water runs into the pit and two No. 10 and one No. 9 Camerons are kept busy. The ore here is deep, however, and of good quality, in one place there being a depth of 250 feet of Bessemer ore running in the neighborhood of 65 per cent iron and 0.03 per cent phosphorus. Instead of the 50 cars the mine could take care of, it is getting about 15, and so the shovel in ore is working one shift. The two shovels which are working at stripping are busy night and day.

It is reported that Supt. Hendricks of the Yates mine between Mountain Iron and Buhl is going to try the experiment of lowering his cars with a hoist into the mine, loading them and hoisting them out again. By this scheme only enough room will be required for a little switching in the mine and the necessity for a long approach will be done away with.

THE MAHONING MINE LATE IN 1905.

Three Shipping Mines.

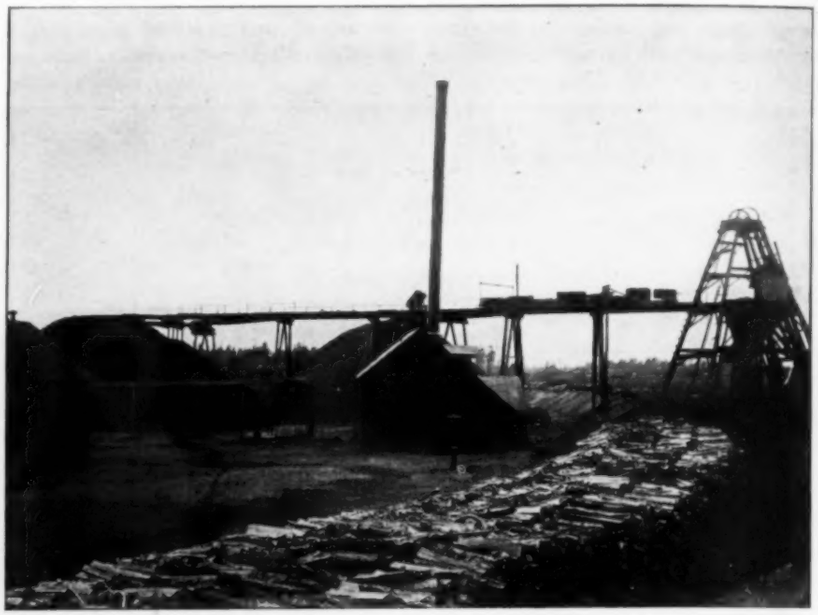
The Rhodes Mining Co. has three mines that will ship during the summer, the Brunt, near Mountain Iron; the Nassau, east of Hibbing, and the Hobart, southeast of Sparta. At the Brunt they began sinking the shaft the first of May, and June 6 began shipping ore over the Great Northern.

Capt. A. Martin now has the shaft down 120 feet and is sending in his drifts rapidly. In contrast to the Brunt, the Nassau and Hobart operated as the Nassau and Hobart Ore companies, are bothered considerably especially the Hobart. The shaft of the Nassau was started in January, but the work was hampered by the encountering of quicksand and the mine will not be ready to ship for about three weeks. The ore is down about 110 feet. The Hobart is as bad a water proposition as there is on the range, if it is not the worst. At present Supt. A. F. Maitland has fourteen small pumps working, an aggregate capacity of 2,000 gallons, but large pumps are to be installed within three or four months, one at the Hobart of 3,000 gallons capacity, designed for a lift of 400 feet (the shaft is now only 185 feet deep), and one at the Nassau of about 1,800 gallons. The expectation is that shipments will be started in about two months.

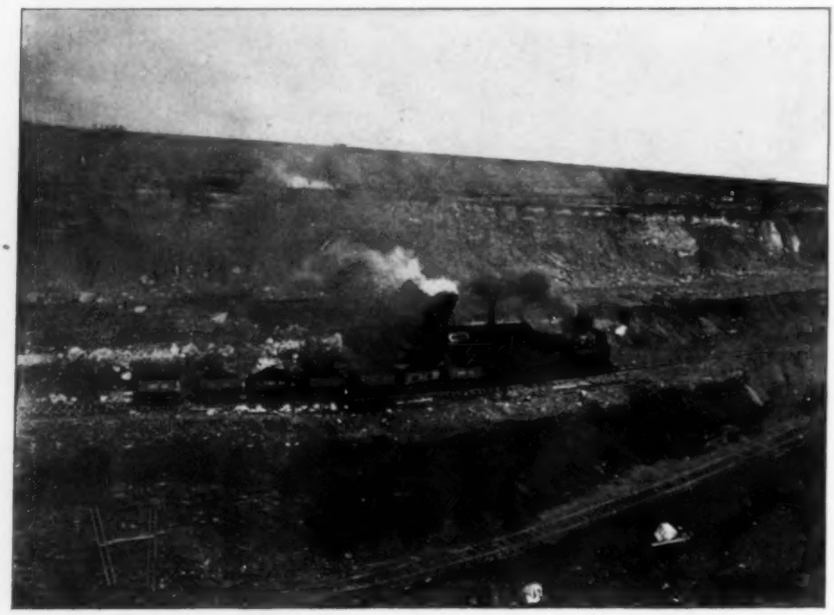
The Hull-Rust Proposition.

The biggest new proposition this year, and what is destined to be one of the biggest pits on the range, is the Hull-Rust. The property covers several forties adjacent to the Mahoning mine and west of the Rust underground mine. Six shovels are now stripping on the site and on the north and west sides the over burden has been removed for a considerable distance from the boundaries. The pit from which ore is being taken by two shovels has been the south bank of the Mahoning and when opened out the two mines will make a tremendous excavation. At present operations are handicapped by the fact that a temporary approach leading in past the Hull shaft on the north side has to be used for the removal of both stripping and ore. The new approach on the south side is nearly completed, however, and it will lead out west of the Hull and run into the main track beyond the shaft house. Supt. W. A. Tappan will uncover the west end as soon as possible to get out of the way of the ore shovels; then the property will be opened up as far east as the Rust cave. The stripping was started a year ago, and ore was shipped at the beginning of the season.

The Hull and the Rust, a view of whose surface buildings and one end of the stock pile is shown in the accompanying cut, are shipping steadily. James Bartlett is captain of the Hull and Harry Nancairo of the Rust. The Hull is afflicted with a considerable amount of water, but not sufficiently to interfere with shipments. A steam shovel has been placed at the Rust stock pile and shipments will soon be commenced.



SURFACE EQUIPMENT AT PILLSBURY, SOON TO BE NECESSARY.



STRIPPING THE AGNEW MINE NEAR THE APPROACH.

The Big Mahoning.

While to the layman the Mahoning mine is sufficiently remarkable because of its size, the true impressiveness of it lies in the magnificent manner in which it has been opened. To be sure, some conditions not true in connection with the opening of other pits have attended the working of the Mahoning, yet the fact remains as an indication of the engineering ability of Manager W. C. Agnew that the Mahoning is without comparison on the range in its appearance and facility for getting out ore. The accompanying view indicates the characteristic appearance of the mine and the stage of operations last fall. The level at which the shovel shown in the center is making the first cuts had been opened over half the mine. Three shovels are working, following each other in widening circles, so that the whole mine looks like a great amphitheater. Although the Mahoning property extends over four forties east

of the present pit, which forties are to be opened so that there will be one continuous pit for about a mile and a half into the town site, just now the mine is badly hemmed in and the ore must be hauled three-quarters of the way around the mine to a switch back and then returning out through a long approach on the west end which has been leased since the destroying of the old approach, which ran over the ground now opened up for the Hull-Rust pit. This long haul saves the shape of the pit and since the Mahoning has never been crowded for ore and now even if it were, could not get cars, does very well. The west end is now being stripped off where the Winston-Dear Co. has one shovel in operation and the Mahoning Ore & Steel Co. has an old shovel of its own. Five drills are working on the Mahoning property between the pit and Hibbing, which would seem to presage the probable opening of those forties next year.

Stripping was begun on the Utica property of Pickands-Mather & Co. a year ago in June. In June of this year the Crete Mining Co. began to ship ore and now could take care of 75 cars a day if they were available. As it is, the one shovel is working only one shift. The pit is west of the Utica shaft, and considering the time it has been worked, has been opened in very good shape by Capt. Hanley. The stripping has been finished until after the close of navigation, but during the winter the present western bank is to be taken off.

The dump approach of the Mahoning, which now runs on the north and west sides of the pit, is to be moved over after the shallow ore in the center of the pit has been removed, and as soon as a fill can be made into the present pit, the ore on the west will be opened. In exploring the deposit test pits were sunk on the east side of the property and considerable rock encountered, so that this was not stripped off, but will be milled down, as there is considerable ore in it. Part of the ore in the open pit is of Bessemer grade, and some is high in manganese.

Oliver Group.

The Oliver group of mines just east of Virginia and operated by the Oliver Iron Mining Co. consists of the Missabe mountains (sometimes called Virginia or Oliver), Ohio, Norman and Lone Jack mines. The present so-called Oliver open pit extends from the southeast forty of the Missabe mountain quarter section, taking in a corner of the Lone Jack and Ohio forties, but has not been worked this year, though the amount required by the lease will probably be taken out. At present there is a shovel stripping off the Ohio and eastward of the Missabe mountain pit running over to the Norman, which has been worked as a milling pit, heretofore. There are several drills to the east of these properties and there are two drills in the bottom of the Norman as well as a test pit. The ore body in the Oliver group is said to run between two and three hundred feet deeper than the present pit and when the stripping has opened the adjoining forties in better shape, this group will develop into an important proposition.

The only other active mine in the Virginia district belonging to the Oliver Iron Mining Co. is the Higgins milling pit. This mine has a unique appearance due to the great quantities of rock through which the workings and raises have been built. The ore has been difficult to obtain, but is a very good Bessemer grade, and one shovel is excavating at present, the ore being hauled in small cars to the raises. Separated from the milling pit by a horse of rock on the west side, is another body of ore on the Higgins lease which is now being stripped by one shovel. Beside these properties the Steel Corporation has the Sauntry, Alpena and Minnewas mines that have been worked in the past but are now idle and have been for some time. The Sauntry and Alpena are adjoining forties and the pit takes in a part of both properties. The Minnewas was last operated in 1894, only about 16,000 tons having been taken out and that from drifting a short distance on one level. There have been reports that the Minnewas was to be started again, but there is little or no prospect of it. The same operator has several leases in the Virginia district not yet opened, among them the Moss and Shaw fees.

The Franklin Group.

The Franklin group of the Republic Iron & Steel Co. includes some of the oldest mines on the range, and the Franklin has been worked out. The Union mine alongside, a half interest in which is held by the Oliver Iron Mining Co., is also idle, but drillings are now being made, old records of the one deposit are being investigated and some test pit work is being done to discover whether or not stripping the mine is feasible. If it should be stripped, it will probably be worked as a milling pit. Just now the stock pile is being shipped and the shovel will go from there to the Bessemer stock pile of about 60,000 tons. All the drilling, the contract for which is in the hands of Cole & McDonald, has to be done from the surface, as both of the idle mines are pretty badly caved and the ventilation is not always good. The operating company is doing its own test pitting.

The active mines of this group are the Bessemer and the Victoria. The Bessemer has been shipping only since 1904, but increased its product in the second year, when it produced 112,630 tons, by nearly 25,000 tons. and it will apparently better that record this season. The Victoria mine

HEAD FRAME AND POWER HOUSE OF RUST MINE.

had been idle for six years up to the beginning of the year, but is now shipping in the neighborhood of 400 tons a day to Two Harbors. This group, to the superintendency of which Louis G. Jenks recently acceded, also includes the Pettit and Kinney mines.

Lincoln Mine.

The Lincoln mine just north of the Commodore is operated by the Interstate Iron Co., which is Jones & Laughlin, and is shipping about the same amount of ore as last year. Four shafts have been sunk, the last one, shaft "D," just this season. One shaft, however, is not being used. The ore body at the Lincoln is not very extensive and a considerable amount of water has to be handled. The power plant is one of the best in the district and consists of twin Lake Shore Engine Works hoisting engines, with 15 x 20-inch cylinders, a tandem compound crank and flywheel compressor, cylinders 13 and 20 x 20 inches, built by the Sullivan Machinery Co., and a Filer-Stowell engine, driving a General Electric, 300-ampere, 250-volt generator. Steam is supplied by three 150-horsepower boilers, built by the Milwaukee Boiler Works.

The Lincoln has stocked a large pile of ore, but it not shipping from it at present. The mine is well lighted with electricity and the tramming is also done by electric motors. Capt. Thomas Pellow has but recently come to the Lincoln from the lower ranges.

All of the properties in this section from the Lincoln over beyond the Victoria are being explored and Cole & McDonald alone have five drills at work. Several hundred yards south of the Victoria an operator having one mine in the north end of the district has a drill working and has sunk a test pit. Operators in general, however, are complaining of labor conditions which are worse this year than ever before. This is true not only because of the scarcity of men, but because of the great shifting about. Some of the mines in this district have had ten and fifteen men quit daily and without the slightest warning, so that now every man who applies for work is hired whether there happens to be a place for him at the time or not. This seems to be an extreme, but it is indeed no exaggeration of the present troublesome situation.

Minorca Mine.

The Minorca, Capt. Joseph Roskilly, is this season shipping close to a thousand tons of ore a day. The old abandoned No. 1 shaft has been replaced by a new No. 3 shaft, which was started about May 1, 1905, and from which ore began to be shipped about a year ago. The shaft is down about 75 feet to the bottom of the ore body and is very dry. The shafts of the Minorca are on a hill and the ore body follows the anticlinal slope of the sub rock so that the ore body is shallow and the water drains off, which probably accounts for the quantity obtained in the Lincoln, Commodore and the new Tesora.

The ground between the No. 3 shaft and the power house is being leveled and cleared in preparation for stocking ore this fall. The power house at No. 3 shaft has a Lake Shore Engine Works' hoisting engine and at the No. 2 power house the engines were built by the Marinette Engine Works, of Duluth. Both sets of boilers were built by the Erie City Iron Works, Erie, Pa. From the Minorca one can see the smoke of the bush fires that the long continued dry weather has caused. At the Elba mine and all around Sparta it became necessary last week to fight the fire and the air is quite heavy with smoke.

Tesora Mine.

This mine in which M. L. Fay started to sink a shaft three years ago, began to ship ore Aug. 8. Last November, Capt. H. Tregillis undertook to complete the abandoned work and after working in quick sand and again through a layer of taconite, with all the water a No. 9 and No. 8 Cameron pump could handle, he got the shaft down 110 feet to ore and now has three drifts started. At the bottom of the old shaft covered with sand Capt. Tregillis found one of the pumps used in the previous work in very good condition. The heavy layer of taconite above the ore prevents the property being stripped and worked as an open pit.

The Tesora is the northeast of the northeast of section 4, 58-17. In the adjoining forty directly west the same interests have sunk a test pit and are now working through the taconite. The hoisting engines were built by the Lake Shore Engine Works and the one boiler now in operation was built by the National Iron Co., of Duluth. A new boiler is being set up which was built by the Gogebic Steam Boiler Works, also of Duluth.

Wacoutah Mine.

Near Mountain Iron an extensive property is just being opened up by the Pitt Mining Co. which is the mining department of the La Belle Iron Works, the same company which controls the La Belle and Miller near McKinley. The property covers four forties, three in section 3, 58-18 and one diagonally across the town road in section 2. The last forty is used as a dump, the ore being very deep. Stripping was begun with one shovel about May 1 and in some places the overburden was only fifteen feet deep. Some ore is already exposed at one end of the long cut and Capt. W. Ellicott expected, with the arrival of an expected shovel in two or three weeks, to begin taking out ore. It hardly seems possible, though that shipping will commence so soon, for, although the contract has been let for the cutting of an approach from the Missabe tracks, nothing has been done on it as yet. It is understood that the approach is being built on a guarantee of $100,000.

WORLD'S TIN OUTPUT.

The approximate tin output of the world in 1905, as calculated by the Geological Survey, was 103,149 short tons, coming from the following principal sections.

	Quantity.	Per cent.
Australia	5,028	4.88
Banka	11,155	10.81
Billiton	2,715	2.63
Bolivia	13,646	13.23
Cornwall	5,040	4.88
Malay States	65,565	63.57
Total	103,149	100.00

During 1905 the United States imported 44,188 short tons, about 43 per cent of the total visible output, valued at $26,316,023, giving an average price of 29.77 cents per pound. This is, however, considerably below the price at which tin sold in New York City during the year. The price of tin at the opening of the year was 29.05 cents, and it gradually rose, with slight fluctuations, until about the middle of December, when it went above 36 cents, closing at about 37⅜ cents. Since January 1, 1906, the price has risen greatly, reaching at one time £215 per long ton on the London market and 48½ cents per pound on the New York market. There has been good reason for tin to rise in price, for, although the production of 1905 was about the same as that of 1904, the consumption increased considerably, and stocks have materially diminished. Nevertheless, the highest prices are probably due largely to speculation, from which cause the price of tin has suffered violent fluctuations through many years.

The lake record for unloading ore was again broken on Sept. 2, when a cargo of 10,000 tons of ore was unloaded from the steamer Wm. E. Corey in four hours and 17 minutes, at Conneaut. Four Hulett unloaders and four Brown electric machines were used. The steamer passed Detroit on its way for a new cargo in 37 hours and 40 minutes after it had passed the same city, loaded, on its down trip.

THE THOMES CORE BOX MACHINE.

The Thomes core box machine, manufactured by the Portland Co., Portland, Me., is shown in the accompanying illustration. This machine is simple and accurate and has been designed to cut core boxes of unusual shapes, two of which are shown in the accompanying illustrations. The machine consists of a heavy box section, surmounted by a stationary table. The cutter-head is driven by belt from a countershaft attached to the bed. The table is maintained constantly at the same height, the cutter-head being raised and lowered, as desired, by turning a hand-wheel within easy reach of the operator. A short time only is required to adjust the machine for the most difficult class of work.

The tool equipment consists of three cutter-heads, a gauge for setting cutters, the necessary cutters for making boxes from ¾ to 24 inches in diameter, wrenches, etc.

The following advantages are claimed by the manufacturer for this machine: There is no inclined shaft, consequently, no oval core boxes. There is no raising of the table on large work, when convenience requires that the table should be in its lowest position. The tool will cut an irregular curve without any change of radius, and will cut hemispherical core boxes for globe or angle valves with extensions of any size in any direction. It will also cut crosses, offsets, bends, Y's, each in one piece, and will do smooth work on the cheapest class of stock. The cutter-heads can be changed in a few seconds, and there is only one hand-wheel to operate.

As an example of the work which this tool will do, the core box shown in Fig. 2, having a diameter of core of six inches and a length of cut 48 inches was sawed from a plank and completely finished, except painting, in 1½ hours. The core box shown in Fig. 3, having a diameter at the large end of four inches and at the circular part of 3½ inches and a length of cut of 30 inches was made in 45 minutes.

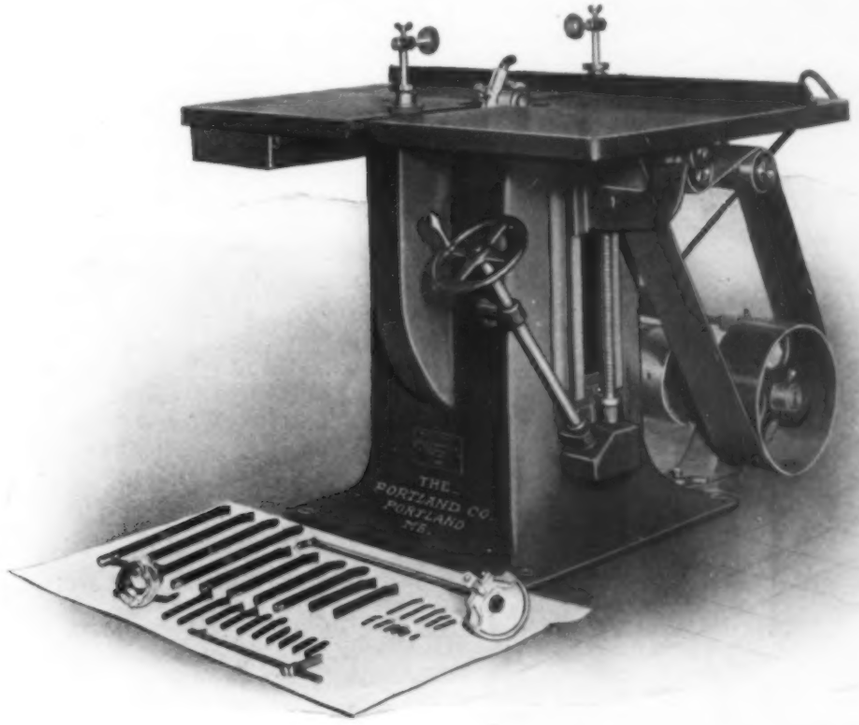


FIG. 1.—THE THOMES CORE BOX MACHINE.

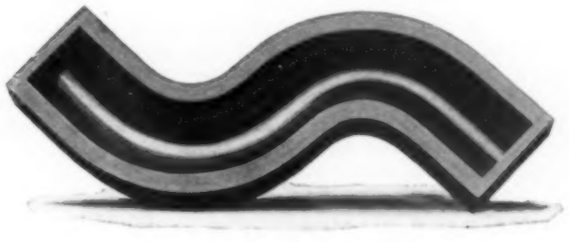


FIG. 2.—CORE BOX MADE ON THOMES MACHINE.

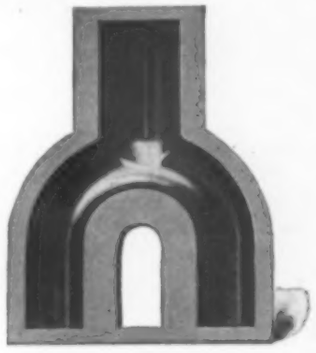
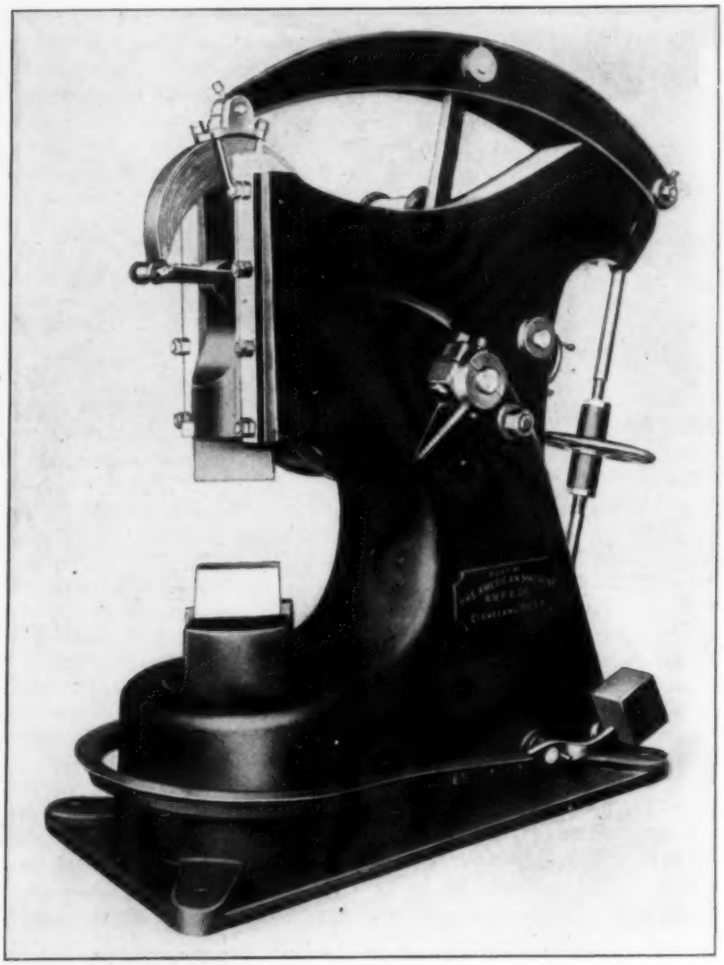


FIG. 3.—CORE BOX MADE ON THOMES MACHINE.

THE "AMERICAN" POWER HAMMER.

In the accompanying illustration is shown the American power hammer, which is applicable for large as well as small work, is easily applied and handled and requires small space, and which presents a number of novel features. It is a belt-driven power hammer that is variable for different strengths of blow and is variable for different sizes of forgings to be handled. The shafts are all of forged steel, while the hammer head, anvil block, helve and lever are of cast steel. All bearings are bronze bushed.



THE "AMERICAN" POWER HAMMER.

No rubber cushions nor leather straps are used in its construction. The spring used to cushion the blow is a heavy leaf spring. The frame is well designed, combining compactness, strength and weight in all places where such qualities are necessary. The anvil block is independent of the frame and is massive. The ram slides are adjustable for wear The lever, which is attached to the ram by means of the leaf spring heretofore mentioned is adjustable by means of a slide at the back for any thickness of forging. The adjusting wheel is within easy reach of the operator and the adjustment is so arranged that the center of the spring is kept over the center of the ram throughout its range. A connecting rod joins the helve to the crank, being attached to an oscillating arm through which the length of the ram stroke is changed. It is attached to the helve and oscillating arm in such a manner as to give a slow and easy ascent and a quick descent to the drop, the ratio being two to one. The hammer is started and stopped by means of a foot treadle which extends around the base of the frame and is connected to the idler at the top of the frame. The pressure on this lever starts the hammer. On removing the pressure, a brake is applied and stops the hammer at the top of the stroke, which is advantageous in drop forging or tool and die work.

The hammer is made in eight sizes, ranging from 75 pounds weight of ram to 400 pounds, with a minimum throw of 3½ and seven inches, respectively and a maximum throw of seven and 14 inches, respectively, for the smallest and largest sizes. The floor space required for the smallest hammer is 18 x 34 inches and its weight is 1,800 pounds. About one-half horsepower is required to drive it. The floor space required by the largest size hammer is 34 x 64 inches and its weight is 8,000 pounds, requiring five to six horsepower for driving.

MANUFACTURING PROFITABLE IN RUSSIA.

Thomas C. Purdy, vice president of the New York Air Brake Co., who has been in charge of the works in Russia for the past five years, has returned to New York. He says: "We have nothing to complain of in regard to our business, in spite of the disturbed conditions in Russia. We made more in the past five months than we did in the preceding fiscal year. Our customers are slow in their payments, but we have not lost $5,000 in bad debts since we began.

"Our work is not confined to air brakes, although we are making all the requirements of European customers. We have even exported air brakes from Russia to England. We have successively taken up the manufacture of shells, shrapnel and other kinds, for the Russian government, incandescent lamps for burning petroleum, windmills on the American plan for wells, and are now introducing gas engines. We can sell the latter in Russia at a profit for less than the duty and freight from any other country, Germany included. All these branches of business have been developed in the past five years and mostly since our operations were checked by the Russo-Japanese war.

"My opinion of the internal unrest in Russia is that it is to a very large extent agrarian. Upwards of 80,000,000 of the population are directly engaged in agriculture, and with the steps which are being taken by the Russian government to give the peasant more land to cultivate, a large conservative class will be created which will out-vote easily any disorderly element. Many improvements in general conditions have been made in the past few years and the Russian government is seriously trying to restore order."

Molybdenum and tungsten exercise similar effects on steel, that of the former being much the stronger.

EXPOSITION OF SAFETY DEVICES.

The American Institute of Social Service will hold in New York city, in January next, an exposition of devices for safeguarding the lives and limbs of working men and women, and for preventing accidents under the ordinary conditions of life and labor to which the general public is exposed.

This will be the first exposition of the kind in this country, and it is surprising to note how far behind other nations we are in this respect.

As far back as 1889 there was a German exposition for the prevention of accidents. In 1893 an exposition of this nature was held in Amsterdam, and since then there have been several similar expositions in continental Europe and in Canada.

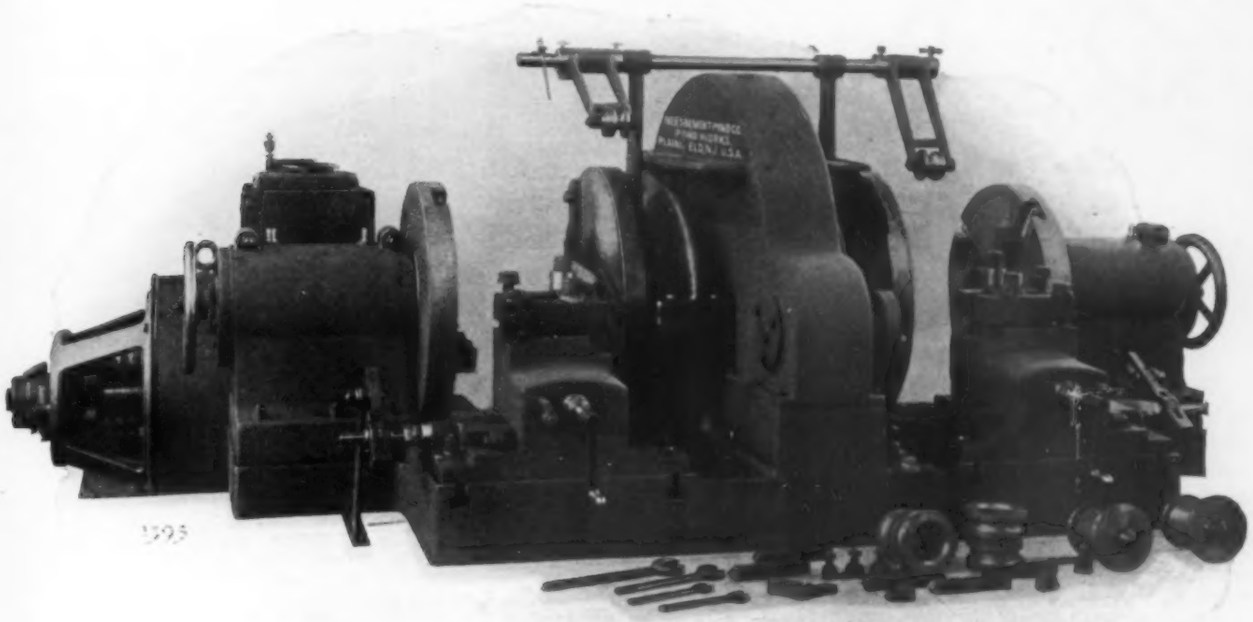
As an outgrowth of these national movements there have been organized several Museums of Security; one at Vienna in 1890, one at Amsterdam in 1893, one at Munich in 1900, one at Berlin in 1901, and one in Paris in 1905, and Russia, which we are inclined to look upon as semi-barbarous, has recently established a museum on a large scale in Moscow.

That these expositions and museums have been of real value to their respective countries is evinced by a comparative study of the number of accidents in Europe and in America, which shows that for the same number of men employed in a given trade, we have from two to nine times as many accidents as they have in European countries.

The interest of manufacturers generally, is solicited, as well as that of organizations whose special function is to improve the conditions of labor, and a widespread response is looked for to this request for representation in the nature of photographs, descriptive drawings, models, and as far as possible, the devices themselves in actual operation.

WILL VISIT ISABELLA FURNACES.

The Carnegie Steel Co. has extended an invitation to the members of the Engineers' Society of Western Pennsylvania and their friends to visit the Isabella furnaces at Etna, Pa., Saturday, Sept. 8, from 2:00 to 5:00 P. M. The works comprise an up-to-date, well equipped blast furnace plant of three furnaces, each of 400 tons capacity per day. They are equipped with electrically operated charging machines and Brown hoist bridges for handling ore, and a Uehling double strand pig casting machine of 1,200 tons capacity daily. One of the furnaces is supplied with dry air by the Gayley dry air process. The dry air plant, which has a capacity of 45,000 cubic feet of air per minute and reduces the moisture 80 per cent, consists of two York refrigerating machines each with steam ends of 300 horsepower and refrigerating ends of 225 tons refrigerating capacity, one York double pipe brine cooler, and one York atmospheric ammonia condenser. The refrigerating chamber contains 100,000 lineal feet of two-inch pipe.



NILES-BEMENT-POND CAR WHEEL LATHE.

THE NILES-BEMENT-POND CAR WHEEL LATHE.

The accompanying illustration shows an improved Pond car wheel lathe, manufactured by the Niles-Bement-Pond Co., New York. This lathe has, in the past two years, been much improved, so that it is a much heavier and better tool than that formerly built by this company. The earlier lathe had a capacity of from five to seven pairs of 42-inch wheels in ten hours. The present lathe has turned out 14 pairs in ten hours. The amount that the tires are worn makes but little difference in the output, as the tread is roughed out at one cut, which may have a depth of from ½ to 9-16 inch.

The improvements made in the last two years have mostly been of a minor character, but the sum total of all has resulted in a marked increase in capacity. The general design of the machine has remained much the same, the

details only being changed. One that may be mentioned is the tool post clamp screws. On the inner clamp screw there is a collar under the nut which raises it above the nut on the front clamp screw. This enables the wrench to be used as conveniently on the front as on the back clamp screw. When the lathes were first put out, they were supplied with a 15-horsepower motor. With the present lathe there is a 30 or 40-horsepower motor. One reason for the great increase in capacity is the use of "suregrip" drivers, which enables the tires to be held absolutely rigid under any cut which the tool steel will stand.

Wolfram in Australia.—A discovery of wolfram has been made at Bulong, West Australia. A prospector, when out among the hills, came across some stone-carrying mineral, which he was unable to recognize, and, thinking it might be of value, took some to the School of Mines, Kalgoorlie. On a test being made the stone was proved to be carrying a considerable percentage of wolfram, and the ore was estimated to be worth about £20 a ton. No work has yet been done at the find, but from surface appearances there seems to be a lode running north and south. A prospecting area of 18 acres has been applied for. The lode has been traced for over 70 yards on the surface, and the ore carrying the wolfram is about six inches wide. —*Iron and Coal Trades Review.*

Blast furnace gas is to be utilized in Russia for power purposes. La Societe des Acieries de Donetz is substituting a number of large gas engines for steam engines.

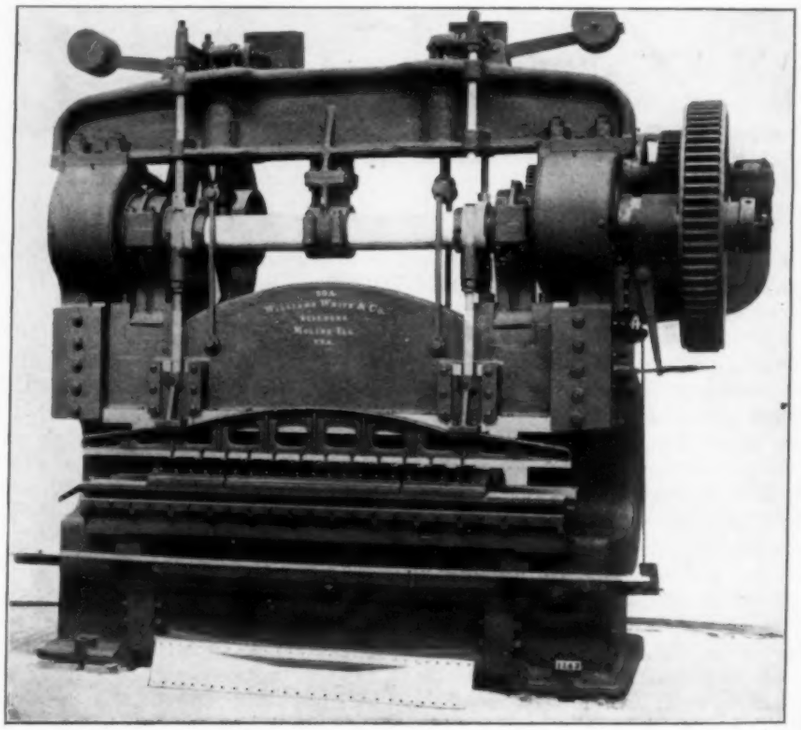
A NEW FOUNDRY LADLE.

The accompanying illustrations show two "Neverbreak" seamless, pressed steel foundry ladles manufactured by the Avery Stamping Co., Cleveland. These ladles are light but strong and durable. They are made in three sizes: 8⅝ inches diameter by 6½ inches deep; 9⅜ inches diameter by seven inches deep; 9⅝ inches diameter by 7¾ inches deep. The first named is termed a 50-pound ladle, the capacity of the other two being in proportion to their dimensions. The company also makes the bails and handles for these ladles. For the plain ladle, a carrier composed of a band 1 x ¼ inch is manufactured, formed into a circular shape to admit the ladle up to the bead passing around it, and welded firmly to a shank 36 inches in length. Although a recent addition to its varied line of specialties, the manufacturer reports a good demand for these ladles, which can be obtained from any foundry supply house.

AVERY FOUNDRY LADLES.

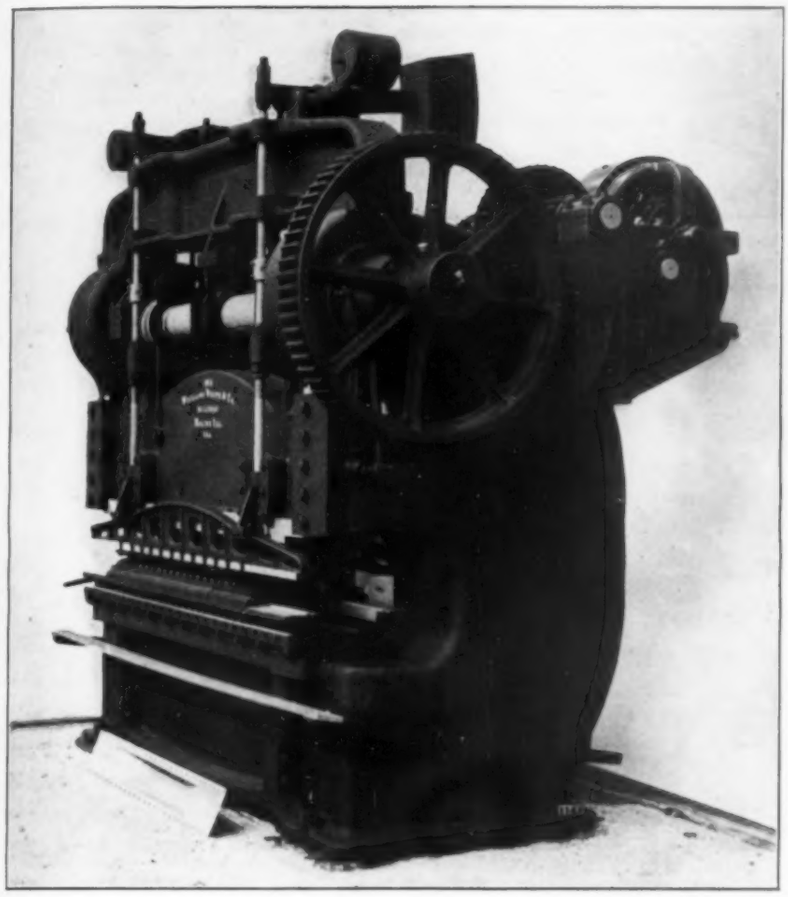
A LARGE MULTIPLE PUNCH.

The accompanying illustrations show a large multiple punch recently built from a new design by Williams, White & Co., Moline, Ill., for steel car work. The frame is heavy and massive, with a deep throat. The ram is driven by two eccentrics from a steel shaft supported by heavy bearings at both ends and in the center, and is counterweighted. Motive power is furnished by a 35-horsepower motor, located on a shelf at the rear of the machine. The tool is started and stopped, by means of a clutch operated by a foot lever, extending completely across the machine. The ram is 11 feet two inches long, the distance between the housings being eight feet 10 inches. The depth of throat in the housing is 18 inches, and the stroke of the ram is 2½ inches. The tool will punch twenty-four 13-16-



FRONT OF WILLIAMS, WHITE & CO.'S MULTIPLE PUNCH.

inch holes in ½-inch plate at a speed of 18 strokes per minute. The weight of the machine complete is 148,000 pounds.



SIDE OF WILLIAMS, WHITE & CO.'S MULTIPLE PUNCH.

GERMANY'S IRON FAMINE.

Consul J. I. Brittain, writing from Kiel, says that in consequence of the scarcity of raw iron the Rhenish-Westphalian Syndicate was recently compelled to place an order for 30,000 tons of smelting iron in England. It has become almost impossible to purchase German smelting iron for export trade. The Krupp Works have stated to the foundry syndicate that their supply of raw iron will not meet the requirements during the first half of 1907. The iron and steel works in Rhenish Westphalia and Lorraine, Germany, are overloaded with orders, and are obliged to extend the time for future deliveries. These iron and steel works had a larger demand for their products during the month of June, 1906, than during the corresponding month during any previous year. It is claimed that the present demand is based upon actual requirements and has no speculative significance. Similar conditions exist in the coal trade in western Germany, and the coal syndicate has been obliged to place a number of orders in England in order to fill all its contracts. There is considerable apprehension expressed regarding the supply of coke to keep the blast furnaces running during the coming fall and winter.

A deal has been closed whereby the Detroit Manufacturing Co., maker of structural steel of a light grade for concrete supports, purchased 22 acres of land lying along Crab Creek and in the northern part of Youngstown, O., for a mammoth plant to be erected as soon as the material can be ordered for the buildings. The company will erect a shop that will employ about 300 men and boys. It has plants in Detroit and Trenton, N. J.

The Federal Steel Casting Co. is building a new open-hearth furnace at its Chester, Pa., plant. Other improvements, including annealing plants, are under way.

Reports are current that the works of the Tidewater Steel Co., at Chester, Pa., will be leased and operated. They include a furnace.

WELSH CHARCOAL IRON.

"There seems to be a misunderstanding in the industrial world as to what is meant by Welsh charcoal iron, writes Consul D. W. Williams, of Cardiff, who says that there has been no charcoal blast furnace operated in Wales for a century and a half.

"They were shut down one by one on account of the disappearance of the forests, and the last of any importance, that at Hirwain, near Merthyr-Tydfil, went out of blast about 1750. But 'charcoal iron' used as a base for terne and tin plate was made in forges until a decade or two ago. The last forge in the forest of Dean was dismantled about 1886, and the last of any importance in Wales were closed about 1890. The result is that no pure charcoal iron is now made in Wales. There are many blast furnaces in Wales, but none of them depend upon native ore, for the entire quantity mined in 1905 was only 363 tons. The bulk of the ore is imported from Spain, and the ore-carrying trade forms a large part of the import business of the Welsh ports. Further, all the furnaces in Wales, with the exception of those of one company, are said to use scrap in the making of pig iron.

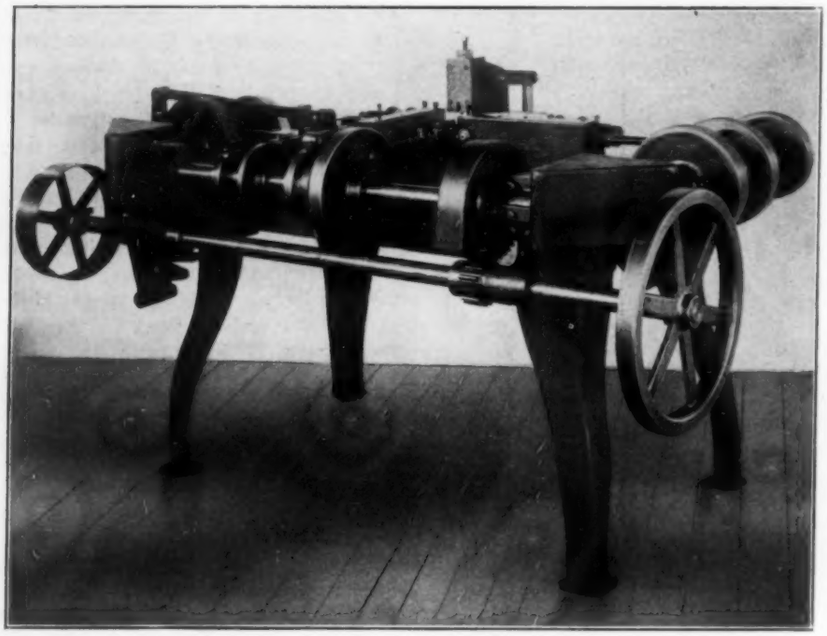
"It is reported, further, that no tin plates are made from pig iron manufactured in Wales, and to my knowledge there is only one firm in England which makes pure charcoal-iron sheets and plates, and this firm at Stourport is said to use all of its own product. About two years ago two companies endeavored to revive the manufacture of charcoal terne plates in Wales, in order to supply an American demand, but the difficulty of securing charcoal tin plates was so great that the attempt was given up. It is confidently asserted that no roofing plates are made in England or Wales from pure charcoal iron. It should be noted, however, that the quantity of roofing plates needed in this country is comparatively small, for practically all roofs are made of slates, tile, or iron.

"The degree of prosperity enjoyed by the trade in this country is dependent in a measure upon the importation of steel from other countries. Oddly enough, the lower price at which these importations are secured enables the trade to compete with the foreign manufacturers of tin plate. The imports of steel bars and billets into this consular district during the year 1905 amounted to about 146,840 tons, of which 50,840 tons came from the continent and about 96,000 tons came from the United States."

AUTOMATIC WIRE STRAIGHTENER, CUTTING-OFF AND MILLING MACHINE.

The accompanying illustration shows the latest improved automatic wire straightener, cutting-off and milling machine built by the Manville Bros. Co., Waterbury, Conn.

This machine is designed to take wire from a coil, straighten, cut off and mill one or both ends of the same, and round or bevel it for such work as lamp burner wires and wires for clock movements, butts, locks and various kinds of builders' hardware. It can also be used for ordinary wire, cutting up to the limit of its feed.



MANVILLE WIRE STRAIGHTENER.

The illustration shows a machine with an attachment by means of which one end of the wires can be squared or flattened by compression. This attachment can be dispensed with when not required.

The tool will handle wire from 0.062 up to 0.171-inch diameter and will cut any length from one inch up to eight inches. Its operation is as follows: The wire is taken from a reel and passed through an oscillating rotary wire straightener, located on the left of the machine, but not shown in the illustration. Through the medium of a positive grip feed, it is forced through the cut-off die to a carrying device and at this point cut off. It is then carried over in line with two milling heads where it is held and one or both ends milled, the wire being ejected after this operation. In case one end of the wire is to be squared or flattened, it is run through the carrier to the squaring or flattening attachment, it being cut off and transferred to the milling heads, after the flattening or squaring operation. The weight of the machine, as illustrated, is 1,850 pounds.

LARGE PUMP CONTRACT AWARDED.

Chicago, Sept. 5.—Contracts for four units of the pumping station to supply the plant of the Indiana Steel Co., at Gary, Ind., with water have been let. The Platt Iron Works, Dayton, Ohio, secured the order for the turbine pumps and the Westinghouse Electric & Mfg. Co., Pittsburg, for the motors. Each of the four pumps will have a capacity of 25,000,000 gallons in twenty-four hours against a head of 100 feet, and will be driven by motors of 600 horsepower each. The water demands of the plant when completed will be upwards of 150,000,000 gallons per day, to supply which seven pumps will be needed. The other three pumps will not be installed until the steel works are finished. An independent pumping plant will be built for the municipal needs, water for which will be taken from Lake Michigan through a tunnel extending into the lake two or three miles. The water for manufacturing purposes will be drawn from the harbor. The first installation of the municipal plant will be of capacity large enough to supply the requirements of a city of 25,000 inhabitants.

MACHINE TOOLS FOR MISSOURI, KANSAS & TEXAS RAILWAY.

The following is a list of tools which the Missouri, Kansas & Texas railway proposes to use in equipping its new shops under construction at Parsons, Kansas. This list is the largest which has been given out by a western railroad in many months. Separate propositions are desired on each tool, with the price stated for delivery f. o. b. cars on the company's tracks at St. Louis, West Alton or Hannibal, Mo., and the price f. o. b. cars at the point of loading. Accompanying each bid must be a full description of the tool offered, with the price, weight, capacity, material used in construction, and size of motor. Working blue print for foundations, showing space allotted for belt connections, etc., will be furnished on application to A. I. Miller, purchasing agent, St. Louis.

One 90-inch driving wheel chucking lathe.

Heavy construction, with chucking device attached to face plate, face plate to have holes for reception of crank pins; arranged for direct motor drive with independent motor to operate movable head. Direct current motors of 220 volts and a range of cutting speed for tires of 10 to 25 feet per minute. Gears to be cut and preferably of steel; all pinions and small gears in gear train to be cut from blanks of homogeneous steel, except at one point, and this to be easy of access for renewal.

One 79-inch driving wheel chucking lathe.

Heavy construction, with chucking device attached to face plate, face plate to have holes for reception of crank pins, extra carriages supporting two extra journal turning rests, to turn journals independent of turning tires; arranged for direct motor drive, with independent motor to operate movable head. Direct current motors, 220 volts, and a range of cutting speeds for tires of 10 to 25 feet per minute. Gears to be cut and preferably of steel. All pinions and small gears in gear train to be cut from blanks of homogeneous steel, except at one point and this to be easy of access for renewal.

One hydraulic wheel press.

Three hundred tons capacity, for wheels 84 inches diameter on tread, resistance head for 12 inches diameter axle, equipped with double acting pump and plungers; arranged for direct-connected motor.

One 84-inch boring and turning mill.

Heavy pattern, fitted with two swivelling heads and positive feeds, four independent jaw chucks for boring tires; arranged for direct-connected, direct-current motor 220 volts.

One 51-inch boring and turning mill.

Heavy pattern, fitted with two swivelling heads, positive feeds and four independent jaw chucks for tires, etc.; with countershaft and belt shifter.

One 42-inch boring and turning mill.

Two swivelling heads; positive feeds; countershaft and belt shifter.

One 37-inch boring and turning mill.

Combination chuck jaws; two swivelling heads; positive feeds; countershaft and belt shifter.

One 37-inch boring and turning mill.

Independent jaw chucks, two swivelling heads, one a turret, positive feeds; countershaft and belt shifter.

One 18-inch slotting machine.

Heavy pattern, with compound tables; cutting bar counterbalanced and quick return; with vertically adjusted guide and relief tool apron and positive feeds; arranged for direct-connected, direct-current motor, 220 volts.

One 15-inch slotting machine.

Heavy pattern, with compound tables; cutting bar counterbalanced and quick return; with vertically adjusted guide and relief tool apron; positive feeds; countershaft and belt shifter..

One horizontal boring and drilling machine.

Spindle four inches; length of bed, eight feet; elevated by screws, cross table; countershaft.

One double car brass boring machine.

Two spindles; to bore four brasses with a range from four inches diameter to 6 x 12 inches long, provided with chucks, boring mandrels for rapid setting and boring; countershafts.

One 72 x 72-inch heavy planer.

Twelve foot bed; extended back cross rail; power pumps and tanks for forced lubrication of ways; two swivelling heads on cross rail and one on each housing; table operated by spiral pinion; arranged to be driven by direct-connected, direct-current motor, 220 volts.

One 32 x 32-inch standard heavy improved planer.

Twelve foot bed; with two swivelling heads; large bearings and power elevating device; countershaft and quick return; free from jerks, with improved shifters and trips.

Two 28 x 28-inch standard improved planers.

Twelve foot bed, with single swivelling head, large bearings, quick return; free from jerks, with improved shifters and trips.

Two No. 3 universal milling machines.

Dividing head; overhang arm, arbor and arbor support, swivel vise, tool makers' universal vise; vertical spindle attachment, triple index center, circular milling attachment; milling arbor 1¼ inches diameter, 12 inches from shoulder to nut; countershaft and pumps.

One No. 1½ universal milling machine.

Dividing head, overhang arm, arbor and arbor support, swivel vise, universal milling attachment; one collet No. 7 outside, No. 4 inside; one collet, No. 10 outside, No. 7 inside.

One No. 4 plain milling machine.

Overhang arm, arbor and arbor support, No. 4 plain vise, heavy vertical milling attachment; one milling arbor with clutch 1½ inches diameter, 26 inches long from shoulder to nut, with sleeve for outer bearing; one collet No. 12 outside taper, No. 9 inside taper; one 12-inch plain index center with undercutting attachment; countershaft and pump.

One No. 2 plain miller.

Overhang arm, arbor and arbor support, vise; one milling arbor 1¼ inches diameter, 14½ inches long from shoulder to nut with collet; each number 10 outside taper and No. 9 and No. 7 inside taper, with countershaft.

Milling cutters for plain and universal milling machine.

One each ¾ inch, ⅞ inch, one inch, 1¼ inches end mills high speed steel No. 9 taper; one three inches diameter, two inches face, 1¼ inches hole. One with nicked teeth four inches diameter, five inches face, 1¼ inches hole, high speed steel; two side milling cutters, six inches diameter, ¾ inch face; two metal slitting saws, four inches diameter x 1-16 inch x 1¼ inches hole; two metal slitting saws, six inches diameter x 1-8 inch x 1¼ inches hole; two metal slitting saws, eight inches diameter x 3-16 inch x 1¼ inches hole; one metal slitting saw, eight inches diameter x ¼ inch x 1¼ inches hole; one each, one inch, 1¼ inches, 1¾ inches, 1½ inches, two inches, 2½ inches, end mills, No. 9 taper high speed steel; one milling cutter nicked teeth four inches diameter, six inches face, 1½ inches hole; one milling cutter nicked teeth, four inches diameter, nine inches face, 1½ inches hole; two metal slitting saws, 6 x ⅛ inches x 1½ inches hole; two metal slitting saws 12 x 3-16 inches x 1½ inches hole; one face cutter inserted teeth, 8½ inches diameter, 2⅜ x 1 inches face to screw on nose of spindle; two side mills, five inches diameter x ⅝ inch face, 1¼ inches hole; two side mills, seven inches diameter x one inch face, 1¼ inches hole; one pair interlocking side milling cutters, six inches diameter total width 1⅜ inches, 1½ inches hole; one pair interlocking side milling cutters, 6 inches diameter, total width 2¾ inches, 1½ inches hole; one end mill, ¾ inch No. 4 taper; one end mill each ⅝ inch, ¾ inch, ⅞ inch, one inch, 1⅛ inches, 1¼ inches, 1½ inches, No. 7 taper, high speed steel; one milling cutter, 2½ inches diameter, ⅜ inch face, one inch hole; one milling cutter, 2½ inches diameter, 1¾ inches face, one inch hole; two side milling cutters, four inches diameter, ⅝-inch face, one inch hole; two metal slitting saws, four inches diameter, ¼-inch face, one inch hole; two metal slitting saws four inches diameter, ¼-inch face, one inch hole; two metal slitting saws, four inches diameter, 3-16-inch face, one inch hole; two 60-degree angular cutters, right and left, 2¾ inches diameter, ½ inch thick, one inch hole; one each, angular cutters for spiral mills 40 degree and 12 degree, 2¾ inches diameter ½ inch thick, one inch hole.

One horizontal milling machine.

Cutters up to 12 inches diameter; planer type, 24 to 32 inches between uprights; center of spindle to table 24 to 26 inches; table ten feet long; positive feeds for table; countershaft.

Two six-foot arm radial drills.

Tapping mechanism arranged to be driven by direct-connected direct-current motor, 220 volts.

Two 14-inch sensitive drills.

Single spindle, with countershaft.

Two 60-inch plain radial drills.

Large and heavy column, with countershaft.

Three 32-inch standard drill presses or radial drills.

Power feed table and cone pulleys of large diameter and width, with and without countershafts.

Two 24-inch standard drill presses.

Table, cone pulleys, with and without countershaft.

Two 20-inch standard drill presses.

Table, cone pulleys, with and without countershaft.

One two-spindle heavy multiple drill.

To drill two 2½ inch holes at one time; counterbalanced spindles; hand and power feeds; table; independent spindle drive; with or without countershaft or arranged for direct-connected direct-current motor, 220 volts.

One 28-inch extension base shaper.

Heavy duty, back geared adjustable crank pins, cone or speed box type, with countershaft and vise.

Three 24-inch extension base shapers.

Back geared, adjustable crank pin, cone or speed box type, vise, countershaft.

One 20-inch extension base shaper.

Back geared, drive of cone type, vise and countershaft.

One 16-inch extension base shaper.

Back geared, drive of cone type, vise and countershaft.

One improved heavy pattern locomotive cylinder boring and facing machine.

To bore cylinders from 16 inches to 28 inches diameter and 40 inches long, and to turn flanges 32 inches diameter; arranged for direct-connected, direct-current motor, 220 volts.

Two two-spindle centering machines.

Capacity ¼ inch to four inches, with three jaw chuck and floor stand; countershaft.

One 36-inch improved engine lathe.

To turn seven feet between centers; positive feeds; arranged for direct-connected, direct-current motor, 220 volts.

One 36-inch improved engine lathe.

To turn 72 inches between centers; positive feeds; countershaft.

Two 28-inch rapid production lathes.

To turn 78 inches between centers; positive feeds; arranged for direct-connected, direct-current motor, 220 volts.

Three 24-inch improved engine lathes.

To turn 60 inches and 72 inches between centers; positive feeds; countershaft; with and without taper attachment and compound rests.

Two 22-inch improved engine lathes.

To turn 60 inches and 72 inches between centers; positive feeds; with and without taper attachment and compound rests.

Three 18-inch improved engine lathes.

To turn 48 inches and 60 inches between centers; positive feeds; countershaft; with and without taper attachment and compound rests.

Seven 16-inch improved engine lathes.

To turn 36 inches between centers; taper attachment; compound rests; countershafts.

One 16-inch universal turret lathe.

For brass work; geared friction head; with turret for six tools; chasing attachment; countershaft; automatic and box chucks.

One 18-inch forming turret lathe.

For brass work; geared friction head; with turret for six tools and undercut forming attachment, automatic chuck, countershaft.

Two 18-inch universal turret lathes.

For brass work; geared friction head; countershaft; chasing attachment; box chucks; hand rests; one revolving jaw chuck; automatic chuck collet, ½ inch to 1⅛ inches advancing by sixteenths for round stock; one extra capacity automatic chuck; collets and hoods; one slide rest.

One 24-inch universal turret lathe.

For heavy brass work; with friction back gears; turret for six tools; geared feeds; taper attachment; lead screw and change gears; independent adjustable stops for longitudinal and cross travel; countershaft; box chucks; revolving jaw chucks.

One two-spindle valve milling machine.

Upright spindle; hardened steel index plate; adjustable heads; countershaft.

One six-spindle automatic valve and cock-grinding machine.

Tools, equipment and countershaft.

One automatic screw machine.

To make plain studs, steam tight studs, set screws, eccentric set screws, etc.; capacity for studs to be 1⅛ inches diameter and 13½ inches long, with a range to ⅜ inches diameter; the eccentric set screws to be 1⅛ inches diameter and three inches long.

Three 2 x 24-inch hollow hexagon turret lathes.

Geared friction heads; automatic chuck; roller feed for different sizes of stock; independent adjustable and supplementary stops; geared feeds; automatic oil pump and complete tool equipment and countershaft.

One hollow turret lathe.

Capable of handling bar stock 4½ inches; diameter; geared friction head; automatic power cross feeds, cut off rest; reversing attachment; oil pump and oiling device for turret; complete tool equipment, and in addition finished extra parts; countershaft.

One improved pipe threading and cutting-off machine.

Capacity, pipe from one to six inches diameter; adjustable die head; full set of chasers for threading standard sizes of pipe from one to six inches, gripping chucks; geared oil pump; countershaft.

Two triple bolt cutters.

Die heads, open die type; automatic opening and closing device for heads; vise jaws with removable grips; cut gears; lubricating pump; chip and oil pans; countershaft, and the following equipment: seven sets cap dies from ¾ inch to 1½ inches advancing by eighths, sharp V thread; seven sets nut taps from 25-32 inch to 17-32 inch, advancing by eighths, sharp V thread, U. S. standard.

One two-inch double bolt cutter.

Die heads, open die type; automatic opening and closing device for heads; vise jaws with removable grips; cut gears; lubricating pump; chip and oil pans; countershaft, and the following equipment: nine sets cap dies, ¼ inch to 1½ inches by eighths, 1¾ inches and two inches; nine taps 25-32 to 1 17-32 inch advancing by eighths, one each, 25-32 inch and 2 1-32 inch, sharp V thread, U. S. standard.

Two six-spindle nut tappers.

Two tap nuts, from ⅝ inch to 1½ inches, for square and hexagon nuts; with nut holders; chip and oil pans; countershaft and the following equipment: six tapper taps each, 25-32, 29-32, 1 1-32, 1 5-32; six tapper taps each, 1 9-32, 1 13-32 and 1 17-32.

One spiral groove shear cut.

Double disc, one on each end of spindle; 12 inches diameter; with two extra spiral grooved steel discs; floor setting up press; countershaft and rests.

Two spiral groove shear cuts.

Double discs, one on each end of spindle; 18 inches diameter, with two extra spiral grooved steel discs; floor setting up press; countershaft and rests.

Four 20-inch water tool grinders.

Water pan raised by ratchet and lever; automatic water drain; countershaft or motor drive; direct-current motor, 220 volts.

Two double emery wheel grinders.

Ten or 12 inch wheels, 1½ or two inches wide; dust proof bearings; universal hand rests and countershaft.

One cap grinding machine.

Two grinding wheels, 24 inches diameter; offset wheel, four inches face for piston rods; wheel one inch wide for crank pins, etc.; steady rests and center grinder; arranged for direct-connected, direct-current motor, 220 volts, or with countershaft and overhead apparatus and pump; tool for truing wheels.

One surface guide grinder.

Planer type, with one cup emery wheel; T-slot table and long bearings; 80 inches in length; with countershaft and pump.

One universal tool grinding and shaping machine.

Tools with shanks, 2½ x 2 inches; rotary pump; chucks for circular, curved and bent tools; crane for changing wheel on spindle; and tool for truing wheel; also sample tools and diagrams giving shapes and angles for setting; countershaft.

One universal grinding machine.

To swing 12 inches diameter and 36 inches or 40 inches between centers; automatic cross feed; swivel table; reversing mechanism; countershaft and pump.

One link grinder.

Range of radius from 30 inches to 80 inches, complete with attachments, and countershafts.

One stay bolt threading and reducing machine.

Six spindles and countershaft for raising and lowering the heads; pump, tank and countershaft; each spindle to have one automatic threading and reducing head; chasers and profiles.

One heavy, double-axle lathe.

To turn eight feet, between centers; equipped with crane and triple block, and countershaft.

One 42-inch car wheel boring machine.

To be provided with three steel chuck jaws, universal or independent, power crane and hub-facing attachment, and countershaft, and improved boring spindle.

One hydraulic wheel press.

Capacity 200 tons and wheels 44 inches diameter; fitted with double acting pump; adjusting arrangement for axles; countershaft.

One volume blower.

Direct-connected to direct-current motor, 220 volts; blower frame to receive motor base; the capacity to be such as to supply 50 blacksmith forges with blast at a pressure not less than six ounces at blast gate.

One volume blower.

Right hand horizontal discharge; countershaft; of capacity to supply 25 blacksmith fires, with blast at a pressure not less than six ounces at blast gate.

One flue welding machine.

Flues two inches and 2¼ inches diameter; roller type; countershaft.

One horizontal punch.

Twenty inches throat; to punch 1¼ inch hole through one inch plate; countershaft.

One solid frame punch.

36-inch gap; to punch one-inch hole through ½-inch plate; countershaft or arranged for motor drive; direct-current motor, 220 volts.

One universal shear.

To shear ¾-inch plate; with or without countershaft.

One bar shear.

To shear 2½-inch square bar; countershaft.

One large tapering roll.

For extra heavy spring plates, six inches wide and ¼ inch thick; rolls of hammered steel and gears of steel; with squeezers and straighteners completed; countershaft.

One combined nibber and trimmer.

For spring plate, six inches wide and ¼ inch thick; gauge attachment and countershaft.

Extra heavy punching and shearing machine.

For shearing spring steel, six inches wide and ⅝ inch thick; gauge attachment.

One 26-inch band, sprue saw cutter.

Eight inches high; with guide above table; countershaft.

One vibrator frame molding machine.

Capacity for flask 21 inches long and 14 inches wide, with solid patterns, principally car brasses.

One three-inch heading and forging machine.

Double stop motion clutch and automatic relief; countershaft and fly wheel.

One 1½-inch heading and forging machine.

Double stop motion clutch and automatic relief; fly wheel; and countershaft.

One 2,500-pound single frame steam hammer.

Anvil dies of cast steel, safety buffers, oil pump and tools.

Three 600-pound single frame steam hammers.

Anvil dies, safety buffers, oil pump and foot arrangement for operating tools.

One 1,500-pound single frame steam hammer.

Anvil dies of cast steel, safety buffers, oil pump and tools.

One universal saw bench.

Pattern work; table 36 x 44 inches, with sliding attachment, universal gauges; cut of gauges to take saws from eight inches to 20 inches diameter; countershaft and segment cutter.

One 30-inch patternmakers' lathe.

Heavy iron bed; eight feet between centers; to swing on rear end of spindle about seven feet; full set of rests and floor stand; countershaft.

One 36-inch band saw.

Patternmakers; table 40 inches long x 36 inches wide; height of cut 18 inches; width of saws from ¼ to ½ inches; adjustable saw guides; countershaft.

One hand planer and jointer.

Patternmakers; bed, eight feet, with work table and tilting device; countershaft.

Two No. 6 bench wood trimmers.

Length of cut eight inches, height of cut five inches; with gauges complete.

One brass melting furnace.

Capacity about 400 pounds per hour; with tools and equipment; for use with natural gas.

One annealing and flanging furnace.

For boiler plates; to use natural gas; about eight feet, six inches x 13 feet, 6 inches inside dimensions; fitted complete with burners; mixing valves and air operated door.

One spring fitting furnace.

Two fitters; to use natural gas; with tools and equipment, balanced doors, burners and mixing valves.

Two furnaces.

For tapering rolls and nibbing machines; for oil or natural gas, with burners, mixing valves, tools and equipment.

One large forging furnace.

For 2,500-pound steam hammer; with balanced doors, burners for oil and mixing valves.

One forging furnace.

For 1,500-pound steam hammer; with balanced doors, burners and mixing valves for oil.

Two forging furnaces.

For bolts, etc.; with burners for oil, and mixing valves.

Two flue welding furnaces.

Burners for oil and mixing valves.

One universal cutter and tool grinder.

Table; transverse and vertical movement; with regular equipment and countershaft.

One hydraulic press.

Double acting pump attached; capacity of 100 tons for pressing out or in; rod bushings; width between supports not less than 16 inches and height 14 inches.

One cornice brake.

Eight-foot; for bending No. 22 iron; with three adjustable stops and quadrant gauge.

One slip roll stove.

Two inches diameter, 37 inches long.

One ring and circle shears.

Hand cut; external and internal circles 3½ inches to 15 inches and square blanks up to 15 x 15 inches.

One power slitting shears.

For ten gauge and lighter, with tight and loose pulley.

One lever punch.

Ratchet stripping attachment and back gauge; to punch ½-inch hole through ¼-inch plate; with punches and dies for ½-inch, ⅜-inch and ¼-inch; 15 inch throat.

SALE OF LOTS AT GARY, IND.

The Gary Land Co., a subsidiary company of the United States Steel Corporation, began the sale of lots in the city of Gary, Lake county, Ind., Monday, Sept. 3. The company has published pamphlets in which the price of each lot and the terms and conditions of the sale are designated. These pamphlets can be obtained by application to the Gary Land Co., at Gary, Ind.

All streets in the first subdivision have been graded and contracts have been made for paving. The two main streets, known as Broadway and Fifth avenue, respectively, will be provided with concrete sidewalks. A modern sewerage system has been designed by competent engineers and is now under construction. The cost of these improvements is included in the price of the lots, so that purchasers of lots will be subject to no expense therefor.

A company has been organized for the construction of a modern water works, gas plant and electric light plant.

The Gary Land Co. has not attempted to make any profit out of the sale of lots, having fixed the price of lots as low as the cost of the land and improvements will permit; the idea being to provide the most wholesome conditions of living for the employes of the Indiana Steel Co. at a minimum cost.

Money Market Dominates Stock Exchange.

The money situation was the dominating factor on the stock exchanges during the past week. Call loans advanced to 12 per cent and time money reached a 7-8 per cent level, as the result of which business was on a considerably smaller scale than during the preceding week, though still of considerable volume. The week opened with a continuance of the bullish activity in leading railroad and industrial securities which began with money rates set in, culminating in a 12 per cent rate, the highest for any August since 1896. Bank reserves were low and the market sagged steadily for the remainder of the week, though net declines in most cases were trivial. The money situation was in part explained by the extensive preparations being made for heavy dividend and interest payments by large railway and industrial corporations. These are estimated at over

Financial Notes:

September dividend payments, according to the *New York Commercial Bulletin*, aggregated $37,279,705 by large corporations. Industrial companies contribute $27,965,110 to this amount, as compared with $15,905,959 a year ago, and $10,750,871 in Sept. 1904.

The General Electric Co. has declared the regular quarterly dividend

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Aug. 25	Closing Quotation Sept. 1	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers Co	20	18¾	−1¼	Sept.	100	19,820,000	.....	.....	.....
Allis-Chalmers preferred	49	48⅛	− ⅞		100	16,150,000	7 cum	.....	Feb., 1904
American Can	7⅛	6¾	− ⅜	Apr. 24	100	41,233,800	.....	.....	.....
American Can preferred	61	60	−1		100	41,233,300	7 cum	5 Q.	July, 1906
American Car and Foundry	41½	40⅜	−1⅛	June 28	100	30,000,000	.....	.....	May, 1905
AmericanCar and Foundry preferred	100¾	101	+ ¼		100	30,000,000	7 n. c.	7 Q.	July, 1906
American Locomotive	71	72	+1	Oct. 16	100	25,000,000		1¾	July, 1906
American Locomotive preferred	113	113	.....		100	24,100,000	7 cum	7 Q.	July, 1906
American Shipbuilding	62¼	61	−1¼	Oct. 2	100	7,600,000	4 n. c.	1 Q.	Aug. 1906
American Shipbuilding preferred	107	107	.....		100	7,900,000	7 n. c.	1¾ Q.	Aug. 1906
American Steel Foundries	11⅜	11⅛	− ¼	Oct. 3	100	17,700,000	.....	.....	.....
American Steel Foundries preferred	45½	42¼	−3¼		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	71	70	−1	June 5	100	1,000,000	4	4	Sept., 1906
Barney & Smith preferred	140	140	.....		100	2,500,000	8 cum	8 Q.	Sept., 1906
Bethlehem Steel	26¼	25	−1¼	April 3	100	15,000,000	.....	.....	.....
Bethlehem Steel preferred	85	82¾	−2¼		100	15,000,000	7 n. c.	7 Q.	Aug ,1906
Bullock Electric preferred	112	112	.....	Oct. 2	100	1,000,000	6	6 Q.	July, 1906
Cambria Steel	36¼	35⅝	−1⅛	March 20	50	45,000,000	6	3 Q.	Aug., 1906
Cambria Iron	49	49½	+ ½		50	8,468,000	4	4 S. A.	Apr., 1906
Colorado Fuel & Iron	58¾	56¼	−2½	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	16	17	+1	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	13⅝	13	− ⅝	Oct. 17	100	25,000,000	.....	.....	.....
Crucible Steel preferred	80⅝	80½	− ⅛		100	25,000,000	7 cum	.....	June, 1906
Empire Steel	7	6	−1	Feb. 28	100	2,281,400	.....	.....	.....
Empire Steel preferred	38	36	−2		100	2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	6	6 Q.	May, 1906
Fay & Egan preferred	128½	128½	.....		100	1,000,000	7 cum	7 Q.	May, 1906
General Electric	169	168½	− ½	May 8	100	48,256,050	8	8 Q.	Oct., 1906
International Pump	50	48½	−1½	June 5	100	12,262,500		2	July, 1905
International Pump preferred	86	85⅝	− ⅜		100	8,850,000	6 cum	6 Q.	Aug., 1906
Lackawanna Steel	72	72	.....	March 14	100	34,971,400	.....	.....	.....
Lake Superior Corporation	17	17⅛	+⅛	Oct. 3	100	40,000,000	.....	.....	.....
Niles-Bement-Pond	130	130	.....	Feb. 7	100	5,000,000	6	6 Q.	Sept, 1906
Niles-Bement-Pond preferred	105	105	.....		100	2,000,000	6 cum	6 Q.	Aug., 1906
Otis Elevator Co	54	55	+1	March 19	100	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. preferred	98	98	.....		100	5,589,500	6 n. c.	6 Q.	July, 1906
Pittsburg Coal Co	14⅝	15	+ ⅜	Feb. 12	100	30,135,000	.....	.....	.....
Pittsburg Coal preferred	56⅞	56	− ⅞		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	53¼	53½	+ ¼	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	98½	97½	−1		100	12,500,000	7 n. c.	7 Q.	Aug., 1906
Pullman Palace Car	237	250	+13	Oct. 18	100	74,000,000		8 Q.	Aug., 1906
Railway Steel Spring	55	54	−1	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	100¼	100⅛	.....		100	13,500,000	7 cum	7 Q.	Sept., 1906
Republic Iron & Steel	31	30½	− ½	Oct. 17	100	27,352,000	.....	.....	.....
Republic Iron & Steel preferred	101	99¾	−1¼		100	20,852,000	7 cum	7 Q.	Oct., 1906
Sloss-Sheffield	79¾	77	−2¾	March 14	100	7,500,000	5	5	Jan., 1906
Sloss-Sheffield preferred	106	106	.....		100	6,700,000	7 n. c.	7 Q.	July, 1906
Tennessee Coal & Iron	160	157	−3	May 15	100	22,352,800		4 Q.	Aug., 1906
U. S. Cast Iron Pipe & Foundry	48¼	47	− 1¼	June 27	100	12,500,000		2	Sept., 1906
U. S. Cast Iron Pipe & Foundry preferred	91¾	91	− ¾		100	12,500,000	7 n. c.	7	Sept., 1906
U. S. Steel	47⅝	46⅜	− 1⅛	April 16	100	508,302,500	2 n c	½ Q.	Oct., 1906
U. S. Steel preferred	108½	107⅞	− ⅝		100	360,281,100	7 cum	7 Q.	Aug., 1906
U. S. Steel 5's	98⅜	98¼	− ⅛		100	463,796,000	5	5 A.	.....
Virginia Iron, Coal & Coke	43⅝	46½	+2⅞	Sept. 18	100	8,641,600	.....	.....	.....
Westinghouse Electric	150	152	+2	June 27	50	20,996,350	10	10 Q.	July, 1906
Westinghouse Air Brake	146¼	151	+5¼	Oct. 2	50	10,900,450	20	20 Q.	July, 1906

the Union Pacific dividend declaration. The market opened strong and stocks maintained their high levels in fair shape despite the adverse influence of the wrecking of the Real Estate Trust Co., Philadelphia, which was responsible for the slight decline on Tuesday. This was recovered the following day and certain railroad securities, together with the United States Steel issues, were strong on reports of the consummation of the Great Northern ore deal. At this time, however, a very decided hardening of $30,000,000, but ample gold importations were understood to be forthcoming in case the situation became acute. The bond market held dull and uninteresting throughout the week. The utterances of Mr. Bryan in his Madison Square speech, while eagerly awaited by financial interests, exerted little influence on general market conditions. Bank clearings for the week showed an almost unbroken record of increases, the total gain for the country being 25.5 per cent, as compared with the corresponding week in 1905.

of two per cent, payable Oct. 15.

Directors of the Crucible Steel Co., at their meeting Sept. 11, it is stated, will consider the matter of resuming dividends at the full seven per cent rate. Dividends at the rate of six per cent were resumed in December, and there is now 15 per cent in back dividends accumulated.

A five per cent dividend, payable quarterly, is soon to be declared by the Nova Scotia Steel & Coal Co., according to persistent reports.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Cincinnati Frog & Switch Co., Cincinnati, O., has been organized with a capitalization of $200,000, half of which will be seven per cent cumulative stock. Charles Partington, for 23 years connected with the Weir Frog Co., of which he was vice president and general manager, will be president of the new concern; George Ashton, until recently in charge of the engineering department of the American Frog & Switch Co., Hamilton, O., and Herman Erdman, of the G. A. Gray Co., will also be among the incorporators. A tract of five acres adjoining the holdings of the Factory Colony Co. has been secured, and three large steel and brick buildings will be erected for the manufacture of railroad frogs and switches.

The Alabama Ore & Iron Co. has been organized by Douglas H. Gordon, William C. Seddon and Richard H. Edmonds, all of Baltimore, with a capital of $100,000 preferred and $400,000 common stock. The company has purchased extensive "gray ore" properties in Talladega county, Ala., analyzing from 45 to 55 per cent of iron, much of it within the requirements for Bessemer.

The New York State Steel Co., Buffalo, N. Y., which is building a large plant on Abbot road, near the Lackawanna steel plant, has increased its capital stock from $1,000,000 to $2,500,000.

The Mesaba Steamship Co., Cleveland, has increased its capital stock from $470,000 to $940,000.

The Vanadium Steel Co., Sharon, Pa., capital $300,000, has applied for a charter and will build and operate a plant at Sewickley, for the manufacture of steel by the vanadium process. Pittsburg capitalists are the main promoters, although men of Cleveland and Akron, O., are interested.

The Waldensia Coal & Coke Co., Lexington, Ky., has filed articles of incorporation. The head office of the company will be located in Lexington. The promoters are: W. E. Cassidy, president; H. C. Thompson, vice president and general manager, and R. M. Jackson, of London, Ky., secretary and treasurer.

The United States Standard Cast Iron Pipe Foundry Co., Burlington, N. J., has been incorporated under New Jersey laws with a capitalization of $2,000,000. The incorporators are: Joseph S. Keen Jr., George M. Bunting, H. B. Hodge, Harold B. King, of Philadelphia, and H. J. Dickenshitz, of Camden.

The Columbia Steel Co., Hartford, Conn., has filed a certificate of incorporation with an authorized capital stock of $300,000 to manufacture and sell steel. The incorporators are: George Pope, W. C. Walker and George T. Morrow, all of whom are officially connected with the Pope Mfg. Co.

The Strauss Bascule & Concrete Bridge Co. and the Wallace-Coates Engineering Co., of Chicago, announce that they have entered into an agreement whereby the latter will act as general agents and constructors for the Strauss bascule and concrete bridges. The latter company was recently organized with a capitalization of $500,000 to do a general engineering business.

The Chase Engine Co., Boston, Mass., has been formed with a capital stock of $200,000, to manufacture and deal in engines and pumps. The officers are: President, Horace Chase, Boston, Mass.; treasurer, W. E. Pearson, Boston; clerk, C. H. Tolman, Portland, Me.

The Crespin Sheet Metal Mfg. Co. has been chartered in Pennsylvania with an office in Philadelphia. John H. Wilson, Riverside, N. J., is president.

The Liberty Bridge Co., Pittsburg, has been incorporated by W. G. Duvall, G. W. Henderson and E. C. Sawhill, Pittsburg.

The Belleville Foundry Co., Belleville, Ill., has been organized to do a general line of casting and jobbing business. R. W. Robriquet is president and I. H. Wangelin is secretary and treasurer.

The Pressure Casting Co., 1122 Whitehall building, New York city, has been incorporated to manufacture metallic castings. The authorized capital stock is $10,000 and the incorporators are: C. G. Armstrong, O. E. Goldsmidt and E. L. McElaine.

The Parker Sheet Metal Works, chartered with a capital stock of $5,000, will manufacture sheet metal products. The incorporators are, Samuel Roussman and Max Cohen, 3905 Third avenue, New York, and Thomas L. Rollo, East Orange, N. J.

The Lancaster Mfg. Co., Lancaster, Pa., has been incorporated under New Jersey laws to manufacture electric car track brakes, car track shoes and electric appliances and to carry on the business of machinists and founders. The capital stock is $125,000 and the incorporators are: A. H. Powden and J. K. Gibbie, Lancaster, Pa.; J. B. R. Smith, Trenton, N. J.

The Conirbo Mfg. Co., chartered with an authorized capital stock of $5,000 will manufacture tools, devices, etc. The incorporators are: George Ackesler, 258 East Ninth street; Jacob Weisser, 131 East Eighty-seventh street and Ralph Julian Sachers, 26 Cortlandt street, New York city.

The West Steel & Iron Casting Co., Cleveland, O., has been incorporated with $30,000 capitalization by Ralph H. West, Frederick Blair, D. P. Landsdowne, W. F. Maurer and Edwin Drake.

The United States Spirits Co., capitalized at $115,000, has been incorporated by Akron, O., capitalists, including G. Forest Firestone, F. G. Carnahan, C. A. Williams, C. E. Siegfried and H. J. Gardner. A distillery will be erected, the company expecting to profit by the recent denatured alcohol legislation.

The Canadian Black Sands Iron Co., Milwaukee, Wis., has been incorporated with a capitalization of $1,000,000, with the object of separating the iron from the sands found on the shores of the great lakes. The incorporaters are: J. J. Williams, of Milwaukee; John W. Smith, of Baltimore; Martin C. Frinke, of Baltimore; Samuel L. Smith, of Minneapolis; John A. Windsor Jr., of Chicago and John W. Stewart, of Toledo. The following officers have been elected: J. A. Windsor, president; John W. Stewart, vice president, and J. W. Smith, secretary and treasurer.

The Canadian Steel Construction Co., Ltd., head office Midland, Ont., capital $50,000, provisional directors, Wm. J. Lethbridge, Duncan S. Storey and Frederick W. Grant, has been incorporated.

The Niagara Falls Heating & Supply Co., Ltd., head office Niagara Falls, Ont., capital $50,000, has been formed to manufacture furnaces, boilers, etc. Provisional directors are: Harry Williams, Oliver D. Glasgow, Wm. L. Doran, Robt. P. Slater, Frank E. Dalton and David B. White.

New Construction:—

The Scullin-Gallagher Iron & Steel Co., St. Louis, is making an addition to its No. 2 foundry, to be used as a molding room. The principal room will be 60 x 280 with an annex 20 x 60 feet. These buildings are to be of modern steel construction equipped with two five-ton electric traveling cranes.

The Malsby Co., Atlanta, Ga., states that it intends to erect a two or three story brick building 62 x 151 feet costing $10,000 or $12,000. It expects to build in about 12 or 18 months.

The Eastern Expanded Metal Co., Boston, has a reinforced concrete factory building, at Cambridge, Mass., nearing completion. It covers 15,000 square feet, and is of a pure type of reinforced concrete construction, the foundations, piers, columns, girders, beams, floors and roof being of stone concrete reinforced with expanded metal. The factory is intended primarily for the manufacture of expanded metal lath, but in adjoining buildings reinforcing steel is turned out.

The Central Foundry Co., Joplin, Mo., is contemplating the enlargement of its plant to accommodate its increasing business.

The new plant of the City Brass Foundry Co., Cleveland, is in operation. Its equipment is of the most modern type, including 12 furnaces and core ovens furnished by the J. D. Smith Foundry Supply Co. Custom work, including all classes of brass, aluminum manganese and bronze castings will be done, recent improvements having quadrupled the output of the company.

The Hoosier Stove Co., Marion, Ind., is to construct an extensive plant containing the following buildings of brick and steel: Office buildings, 20 x 80 feet, two stories; ware room, 80 x 180 feet; mounting room, 60 x 200 feet, 2 stories; foundry 100 x 200 feet, one story with lantern the entire length; boiler room 30 x 38 feet; wash room, rattling room and a pattern room. Some equipment has been purchased, but the company is still in the market for punches, drill presses, heavy brakes, shears, presses, motors, exhaust fans, blowers, a complete nickel plating plant and all the small tools needed in a stove and range factory. Catalogs and prices are solicited. The plant is exceedingly well located as regards railroad connections.

The Potter & Johnson Machine Co., Pawtucket, R. I., has let the contract for a one story brick building, 46 x 147 feet, to be used as a casting cleaning department

The Maine Central railroad is making about $35,000 worth of additions to its car and repair shops, at Portland, Me.

J. E. Plimpton, Norwood, Mass., is building a 26 x 90 feet addition to his foundry, to be used as a molding room and machine shop.

The United States Lock Factory, Lyons, Iowa, has prepared plans for extensive additions to its plant.

The Avery Plow Co., Oklahoma City Okla., is to erect a three story brick building 75 x 100 feet.

The Anti-Friction Spiral Bearing Mfg. Co., Hannibal, Mo., is to erect a foundry building and a number of other factory structures.

The Mud Lick Coal & Coke Co., Osaka, Va., is planning the construction of 100 coke ovens at that place.

The Indiana Steel Co. has let the contract to the Falkenau Construction Co., of Chicago, for 297 dwellings to be built at Gary, Ind. These will cost from $4,000 to $13,000 each.

The Cascade Foundry Co., Erie, Pa., of which John D. Hay is president, has purchased a site on which it will erect a $50,000 foundry building.

The William Osborne Machine & Foundry Co., DuBois, Pa., is to erect important additions to its plant.

The St. Clair Air Brake Co., recently corporated, with a capital stock of $100,000, is to establish a factory in Indianapolis, Ind., for the manufacture of air brakes and other railroad supplies. A. A. St. Clair is interested.

S. S. Severance Mfg. Co., Glassport, Pa., is to erect a steel nail and spike mill. The work is in charge of James Bryan, Park Bldg., Pittsburg.

The factory to be erected at New Haven, Conn., by F. P. Pflegher & Sons, manufacturers of hardware and special machinery, will consist of a four story reinforced concrete structure 60 x 260 feet, with a one story building 40 x 200 feet, to be used as a casting room, forge shop, annealing room and engine room.

The Woburn Machine Co., Woburn, Mass., has begun work for an iron foundry 58 x 90 feet and a carpenter and pattern shop 30 x 60 feet.

The Goodell-Pratt Co., Greenfield, Mass., is to enlarge its works by the erection of a new foundry 75 x 170 feet, two stories in height.

Crane & Co., Boston, Mass., has plans prepared for a new pipe cutting factory 60 x 138 feet with two storage buildings of a smaller size for storing iron piping.

The Hunter Machine Co., North Adams, Mass., has let the contract for a 50 x 100 foot addition to its erecting shop.

The Baltimore & Ohio railroad has completed arrangements to four-track its line from Pittsburg to the Connellsville coke region, a distance of about 70 miles.

The Ludlum Steel Co., manufacturing steel dies and tools, is to erect a two story structure 75 x 300 feet, at Watervliet, N. Y. It is to be ready for operation about December 1.

H. A. Lanman, Columbus, Ohio, has prepared plans for a bolt manufacturing plant 60 x 95 feet, to cost about $10,000.

The Norton Co., Worcester, Mass., will erect a brick addition 94 x 80 feet, four stories in height, to be used as a crushing building. The cost will be about $15,000.

It is announced that a large factory will be erected at Meriden, Conn., by the Sears & Roebuck Co., as a home for the Meriden Firearms Co.

The Globe Foundry Co., Johnstown, Pa., which has purchased the foundry of W. F. Rosensteel, expects to enlarge the plant and make a specialty of car castings.

The Byron Jackson Machine Works, which has been temporarily located at Oakland, Cal., since the fire, has let the contract for a steel structure, 110 x 250 feet, with a large pattern shop, at West Berkeley, Cal.

The Shenandoah Steel Wire Co., erecting a large steel wire mill at Buffalo, N. Y., is filling its machinery supplies through W. W. Gibbs, 150 Nassau street, New York.

The Dion Mfg. Co., Wilkes-Barre, Pa., is erecting two reinforced concrete buildings for the manufacture of drop forgings and enameled ware. Bids for equipment are being received.

The Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., is to erect a small structure connecting its two present buildings.

The National Malleable Casting Co., Cleveland, O., has a storage building about 200 feet square well under construction.

The Browning Engineering Co., Cleveland, O., has had plans prepared for a structural shop about 80 x 160 feet, but may postpone building until later.

General Industrial Notes:—

The furnace of the Hudson Iron Co. at Secaucus, N. J., will be blown in about Sept. 15. Both of the mines recently opened by the company are shipping iron ore. The furnace has been entirely overhauled and supplied with new hoist and other equipment.

The Morse Chain Co., having removed its works and offices from Trumansburg, N. Y., requests that all mail, express and freight be addressed to the company at Ithaca, N. Y.

The Alliance Foundry Co., Alliance, O., recently organized with a $20,000 capitalization, has chosen W. H. Kelley as president and general manager,

John N. Kelley, treasurer and W. S. Doyle, secretary. A plant is to be erected on a site not yet determined.

The Easternhouse Engine Co., Taunton, Mass., has begun the manufacture of engines and motor boats. Its present quarters are badly cramped and an addition to its factory is planned.

Wm. H. Whitaker, referee in bankruptcy of the Brackett Bridge Co., Cincinnati, has filed the appraisement showing its assests to be $218,980.

A decree of sale has been issued against the Delphos Foundry Co., Lima, O., and the receivers have set October 1 for the sale at public auction.

The Southern Association of Stove Manufacturers' meeting Aug. 29, at Chattanooga, decided upon an advance of 5 per cent in the prices of all grades of stoves.

Stockholders of the Williams & Goldenbaum Co., Wallingford Conn., manufacturers of saws, have decided to dissolve the corporation which has been in business for the past three years.

Action is threatened to test the McCall's Ferry Co.'s right to build a dam in the Susquehanna below Columbia, Pa.

The Hutchinson Machine & Foundry Co., Hutchinson, Minn., which was closed some months ago, has been reopened for custom work in charge of C. O. Morgan.

The entire plant of the American Sheet & Tin Plate Co. at Muncie, Ind., has resumed operations after the regular summer shut down.

The Peck-Williamson Co., Cincinnati, manufacturing furnaces, is seeking a new site on which to combine its foundry and factory. The foundry plant at present located at Wellston, O., will probably be removed to Cincinnati.

The Haley Machine Works, Rockwood, Tenn., after an idleness of some time, is again in operation.

The Kankakee Foundry Co., Kankakee, Ill., recently incorporated, takes over the business which has been operated as the Gartland foundry of that city.

In an attempt to break up the present monopoly of the Italian steel trust, the Italian government has been testing battleship armor plate supplied by the Bethlehem Steel Co.

Fires:—

The foundry and machine shops of the D. June Co., Waco, Tex., was destroyed by fire Aug. 26, with a loss of $10,000.

Considerable damage was done by fire Aug. 27, to the shops of the B. & O. railroad at Parkersburg, W. Va. The carpenter shop, together with a number of cars undergoing repairs, was destroyed and the machine shop nearby was badly damaged.

The warehouse of the Detroit Foundry Supply Co., Detroit Mich., was partially destroyed by fire Aug. 25.

The Dakota Machinery Co., Devil's Lake, N. D., sustained a loss of $10,000 by fire Aug. 20.

The boundary Iron Works, Grand Forks, B. C., was damaged to the extent of $30,000 by a recent fire.

The American Can Co. now estimates the recent loss to its Minneapolis plant by fire at $100,000. The works will be rebuilt at once and on a more extensive scale.

The general shops of the Norfolk & Western railroad at Roanoke, Va., were damaged to the extent of $100,000 by fire Aug. 10. Lightning was sesponsible for the blaze.

The Utica Drop Forge & Tool Co., Utica, N. Y., sustained considerable damage by fire Aug. 17, the blaze originating in the tool tempering department.

The Firth Sterling Steel Co., occupying quarters at 53-55 North Desplaines street, Chicago, sustained a loss of $8,000 Aug. 23, in the fire which destroyed the neighboring plant of the John Lucas Paint Supply Co.

Trade Notes:—

The Petersburg Fire Brick & Tile Co., Coal Grove, O., reports a heavy sale of its cupola daubing or fix, which is made of ganister and fire clay. The foundries mix it into a stiff mud and plaster up the iron bed to the tuyeres and over the bottom of the cupola, finding that it stands the heat and blast, and if used regularly preserves the cupola lining for years. It is also used for core making and for general foundry use.

The R. W. Whitehurst Co., Norfolk, Va., manufacturer of agricultural implements, desires to communicate with makers of small brass gear or cog wheels.

The Panama canal commission has called for bids on 40 additional mogul freight locomotives, and 5,000 tons of steel rails. The locomotives are to be substituted for the old French engines.

The Browning Engineering Co., Cleveland, O., is shipping four of its No. 1 cranes of ten tons capacity and four of its No. 2 of fifteen tons capacity to the Panama canal zone. Two of each number are equipped with buckets. The company reports orders which will cover its entire outfit for three or four months.

Recent sales of the G. H. Williams Co., Cleveland, builders of clam-shell buckets, include the following: Six 3-yard buckets for Heyl & Patterson, Inc.; one ½-yard bucket for the Canadian Pacific railroad; one ¼-yard bucket for the Ohio Sand & Gravel Co., Marietta, O., and two 2-yard buckets for the Dodge Coal Storage Co., Philadelphia.

The Ball Engine Co., Erie, Pa., reports the following among recent orders for cross compound engines: One 700-horsepower for city of Aurora, Ill.; one 800-horsepower for National Tube Co., Pittsburg, Pa.; two 700-horsepower for Duluth & Iron Range Ry., Duluth, Minn.; one 600-horsepower for Flint Lt. & Pwr. Co., Flint, Mich.; and one 700-horsepower for Pennsylvania R. R. Co., Altoona, Pa. In single cylinder engines the following sales have been made: One 550-horsepower for Washington Elec. Light & Power Co., Washington, Pa.; one 550-horsepower for Natalbany Lumber Co., Montpelier, La.; one 400-horsepower and one 320-horsepower for Craddock-Terry Co., Lynchburg, Va.

The Union Iron Works, Spokane, Wash., reports a phenomenal volume of business, practically double that of last year.

The Riverside Foundry, Belleville, N. J., is turning out a record order of cast steel steam fittings for the North River Iron Works.

TRADE PUBLICATIONS.

The Wellman-Seaver-Morgan Co., Cleveland, has recently issued three bulletins devoted respectively to stamp mills and equipment, copper converters and equipment, and to Akron crushing rolls. The stamps range in weight from 500 to 1,400 pounds, with single and double issue mortars as desired. The second bulletin describes a line of hydraulically and electrically operated converters. The third bulletin describes a line of Akron crushing rolls both of the spring and rigid type, the former ranging in size from 24 x 12 to 54 x 20 inches, and the latter from 16 x 10 to 36 x 16 inches.

The Chandler & Taylor Co., Indianapolis, has issued a booklet of bulletins, describing its products, which is gotten up in an extremely attractive manner. It consists of a series of loose leaves bound in a serviceable cover, the leaves being well printed in colors and splendidly illustrated. The different items described in the various bulletins comprise high speed engines, both of the automatic and throttling type, tubular boilers, both horizontal and vertical, semi-portable power plants, engine and boiler accessories, etc.